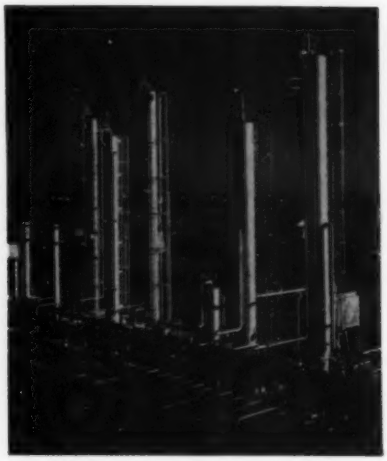
World Petroleum

five dollars
per year
one dollar
per copy

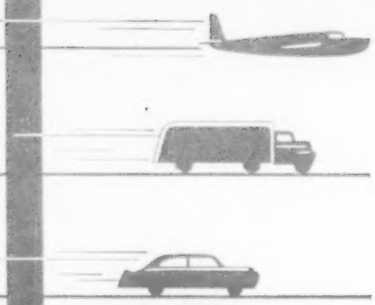
thirty-first annual meeting ▶ ***november, 1951***

Stabilized



FOR **MAXIMUM**

- AIR SPEED
- TRUCK POWER
- CAR MILEAGE



To keep up with the progress being made in transportation and industry today, modern motor fuel must be all that the name implies. Advancement in the design of internal combustion engines must enable today's traffic to move faster; enable farm and industrial equipment to carry bigger loads with increased safety.

Refiners are meeting these needs by blending with WARREN'S Stabilized Natural Gasoline. It has fine lead susceptibility — provides the necessary High Octane, Quick-Starting, Anti-Knock, Carbon Free elements which insure Greater Volatility and Uniform Quality.

NATURAL GASOLINE
Butane
Propane
Iso-Butane
Iso-Pentane
Hexane
Heptane
STA-VOL-ENE

WARREN PETROLEUM CORPORATION

Producers, Manufacturers, Exporters and Marketers

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Crude Oil, Natural Gasoline and Liquefied Petroleum Products

NEW HORTON TANKS

Boost Storage Facilities At Puerto La Cruz

HORTON VAPOR-SAVING UNITS

- *Hortonspheroids and Hemispheroids*—Designed to prevent excessive evaporation losses from hydrocarbons ranging in volatility from motor gasoline to natural gasoline. Capacities range from 2,000 to 120,000 bbls. with working pressures from 2½ to 100 lbs. per sq. in. (higher pressures available in smaller sizes only).
- *Hortonspheres*—For efficient, economical high pressure storage of the more volatile hydrocarbons. Standard sizes include units up to 65 ft. in diam. for gases or 25,000 bbl. capacity for liquids with operating pressures from 30 to 150 lbs. per sq. in.
- *Hortondome Roof*—An effective means of preventing evaporation losses during standing storage. May be used on individual tanks or as the central unit of a vapor saving system by interconnecting the vapor spaces of adjacent cone roof tanks.
- *Horton Floating Roofs*—Used extensively to stop evaporation, cut down corrosion and reduce the fire hazard on working tanks. Available in three types: the Double Deck—the Pontoon—and the Pan.

The six 20,000-bbl. Horton tanks shown in the foreground of the above view, were installed at the Sinclair Oil & Refining Co. refinery at Puerto La Cruz, Venezuela, to provide additional storage facilities for crude oil and refined petroleum products. The two structures on the left are equipped with Horton Pontoon Roofs while the four on the right are cone-roof tanks. With these additions, the total capacity of the storage tanks in the refinery area and the marine loading terminal is more than 2,200,000 barrels.

Tanks and refinery structures at Puerto La Cruz, Curacao, Salamanca, Atzcapotzalco, Antofagasta, and Amuay Bay are typical of the many Horton installations that are playing such an important part in the rapid expansion of the petroleum industry in Mexico, Central America, South America and the West Indies.

Horton equipment is rewarding this confidence by increasing production and setting higher standards of operating efficiency. Every Horton installation is the product of years of specialized experience in combining the proven economies of modern engineering with careful fabrication and erection methods.

For more information about Horton storage tanks or Horton refinery structures such as propanizers, absorber columns and dehydrators, write our nearest office. We are completely equipped in our strategically located plants to fabricate from steel or corrosion resistant metals to fit your special requirements.

CHICAGO BRIDGE & IRON COMPANY

Chicago • Houston • Tulsa • San Francisco • Birmingham • Atlanta • Cleveland • Philadelphia • Los Angeles • Salt Lake City • Boston • Seattle • Detroit • Washington
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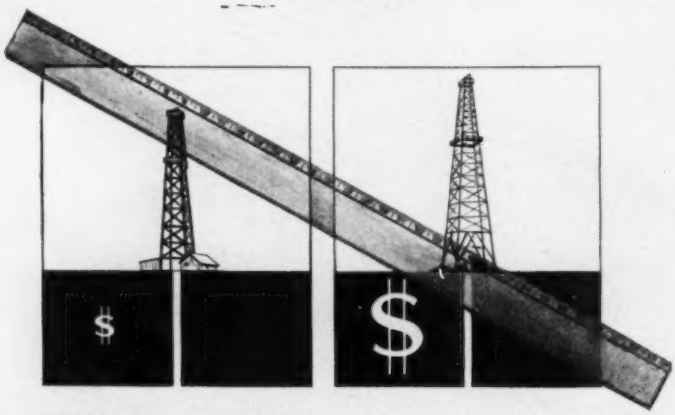
BY ANY YARDSTICK... CEMENTING PRICES ARE LOW



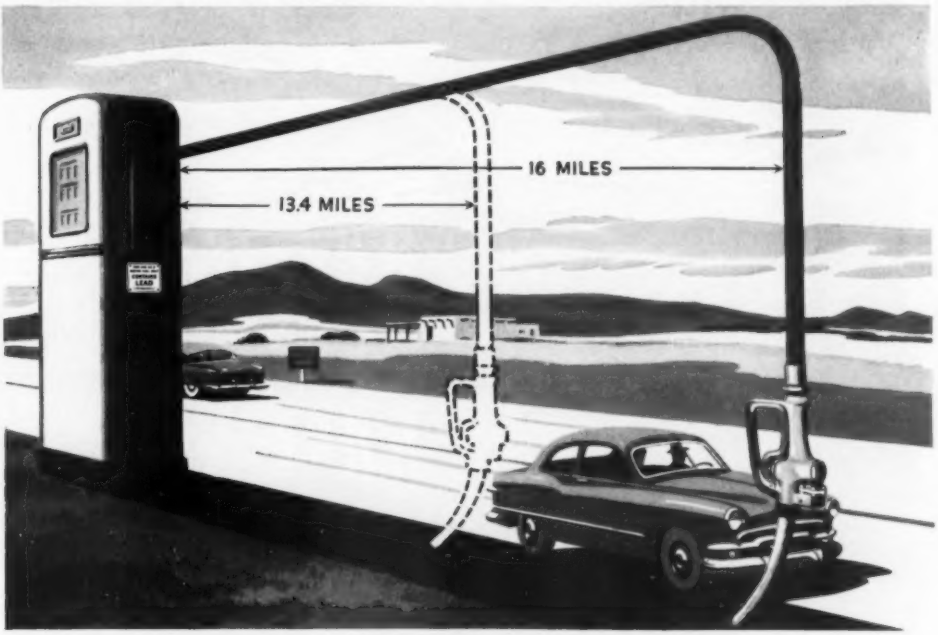
DRILLING COSTS Writing in a leading oil journal, a production executive of one of the world's largest oil companies makes the statement that "the average well-drilling costs have more than doubled in the last 10 years." The increase, he says, is the result of higher wages, higher investment costs of equipment, higher cost of materials and supplies, and the greater average depth of wells.

Although affected by the same conditions, the price of cementing has risen only slightly in the same period and is, in fact, lower today than it was in 1924.

By any yardstick, Halliburton cementing prices are low.

Erle P. Halliburton
Chairman of the Company
HALLIBURTON OIL WELL CEMENTING CO.
Duncan, Oklahoma

If the antiknock fluid now used in gasoline were eliminated, a car which currently gives 16 miles per gallon would give only 13.4 miles, providing the compression ratio were lowered and the rear axle ratio changed to maintain present standards of performance.



ANTIKNOCK COMPOUND

Each gallon of today's gasoline can go about 16% further because it contains a few drops of antiknock fluid. Here's how this vital ingredient stretches mileage in modern cars

It's too bad that the marvelous computing pumps you see in most gas stations can't show the "miles" you are buying, as well as the gallons and cost, because the true value of gasoline to the motorist is best expressed by the number of miles it will drive a car. On this basis modern gasoline containing antiknock fluid is a tremendous bargain. Look at these facts:

1. **Today's cars, with few exceptions, are heavier, more powerful and faster than their counterparts of twenty-five years ago.**
2. **Despite increases in weight and power, many modern cars actually deliver more miles per gallon.**

There are a number of reasons for greatly improved "ton-mile" economy. Better engine design, reduced wind resistance of streamlined bodies, less friction in bearings, etc. But high on the list is today's high octane number gasoline, which permits higher engine compression ratios and correspondingly higher engine efficiencies.

The high octane gasoline which you can buy at any gasoline station for about the same price today (excluding taxes) that you paid in 1925 is a much improved product. First, because of greatly advanced refining methods. Secondly, because of the addition of antiknock fluid.

If antiknock fluid were not available, *all* gasoline today would be an average of ten octane numbers lower. To operate satisfactorily on this lower octane gasoline, automotive engines of the latest design would have to have their compression reduced about one ratio. Under these conditions, the only way to restore acceleration and hill-climbing ability to present levels would be through a change in rear-axle ratio to increase engine speed. The lower compression ratio in combination with increased friction at the higher engine speed would cause a loss of about 2.6 miles per gallon in cars which now average around 16 miles to the gallon or about 16%.

So, you see, the antiknock fluid in each gallon of gasoline used in an engine of modern design is actually worth up to 2.6 miles of driving. Multiply this by the number of cars produced during the past few years, and it represents a truly tremendous saving in the nation's gasoline bill.

ETHYL
CORPORATION
New York 17, N. Y.

Makers of "ETHYL" antiknock compound

WORLD PETROLEUM for November, 1951. Vol. 22, No. 12, November, 1951. WORLD PETROLEUM is published monthly by Mona Palmer, Trustee under the will of Russell Palmer, 2 West 45th St., New York 36, N. Y. Acceptance at East Stroudsburg, Pa., under Section 34.64 P. L. & R. Authorized. Subscription rate: $5.00 per year, single copies $1.00. Copyright, 1951 by Mona Palmer, Trustee.

...for Efficient HEAT EXCHANGE

Always Specify AEROFIN

Aerofin gas-engine jacket-water cooling installation, La Gloria Corporation, Falfurrias, Texas. Designed to cool 334,200 gallons of water per hour from 155° to 145° using 100° ambient air. Heat transfer 27,850,000 BTU/hr. Engineered and built by Hudson Engineering Co.

Whatever the heat-transfer problem — whatever the medium — whatever materials are required for highest efficiency and lowest maintenance costs, you can always rely on Aerofin.

Unequalled experience and production facilities, plus constant research and materials testing, assure the proper construction and design for greatest efficiency and longest service life. ***Ask the Aerofin man.***

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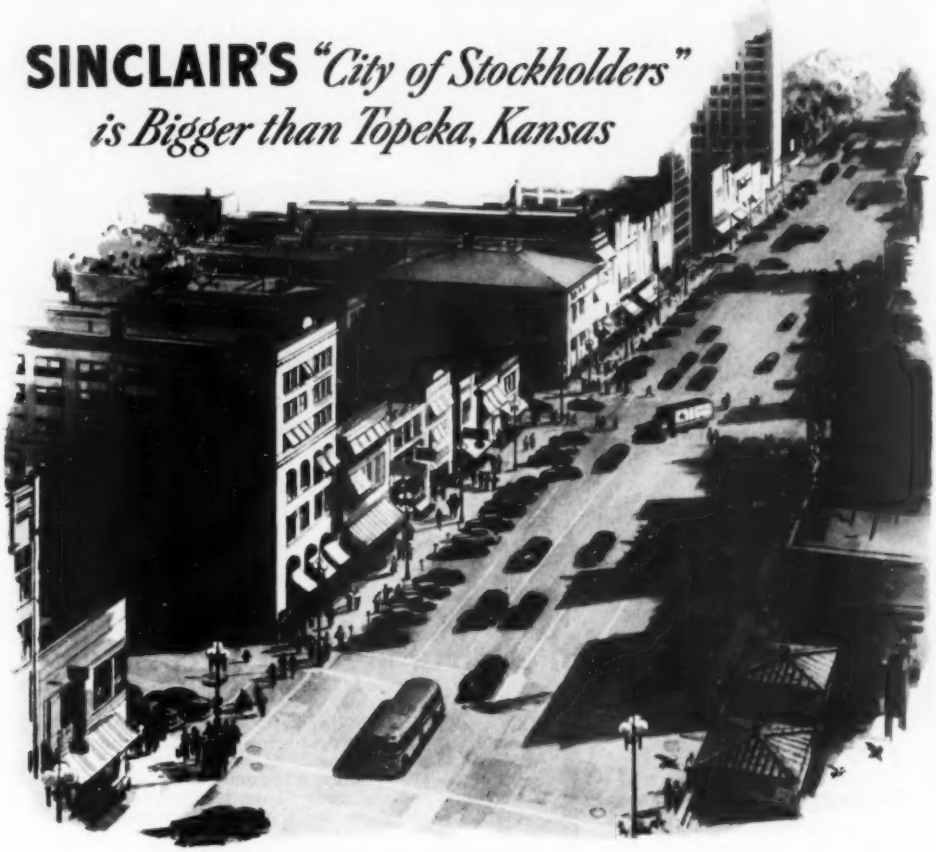
Aerofin is sold only by manufacturers of nationally advertised fan system apparatus. List on request.

SINCLAIR'S *"City of Stockholders" is Bigger than Topeka, Kansas*



SINCLAIR'S "City of Stockholders" has an even larger population than Topeka, the Capital of Kansas—which will give you an idea of the broad ownership of this corporation.

Sinclair has 100,542 stockholders—people of wealth and moderate means, employees, widows, men and women who have retired. The list of shareholders includes many leading institutions—colleges, hospitals, churches, as well as insurance companies, investment trusts and trust funds. No one person owns more than 1% of the stock. In fact, the average holding is 121 shares.

This widespread ownership of Sinclair by people and institutions all over the United States, imposes a responsibility which Sinclair management endeavors to fulfill by policies that are both prudent and progressive—as they must be to meet the competition of other leading companies in America's oil industry.

SINCLAIR
A Great Name in Oil

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Pritchard Designs for Versatility and Accessibility

Our Single Responsibility Contract includes:

- Design
- Processing
- Engineering
- Purchasing
- Field Construction
- Guarantees
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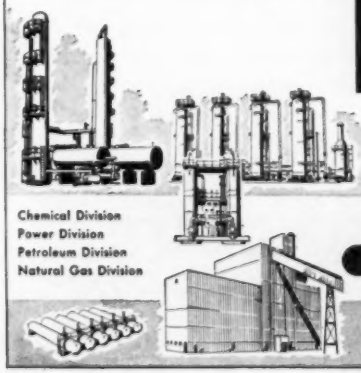
- "Turnkey" Basis

This unit is typical of Pritchard's forward looking ingenuity in Design, Engineering and Construction. Designed to the customer's requirements for replacement of an existing crude unit and for processing six different types of crude oil at a nominal capacity of 22,500 bbls. day, this unit simultaneously produces eight different distillate fractions ranging from light gasoline to cylinder stock!

At the same time particular care was taken to design the unit for maximum accessibility to the heat exchanger equipment, thus facilitating handling and reducing "shut down" time and maintenance costs.

For the most modern advancements in petroleum processing, let Pritchard engineers develop your next project from drawing board to "on stream."



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Power Division
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Natural Gas Division

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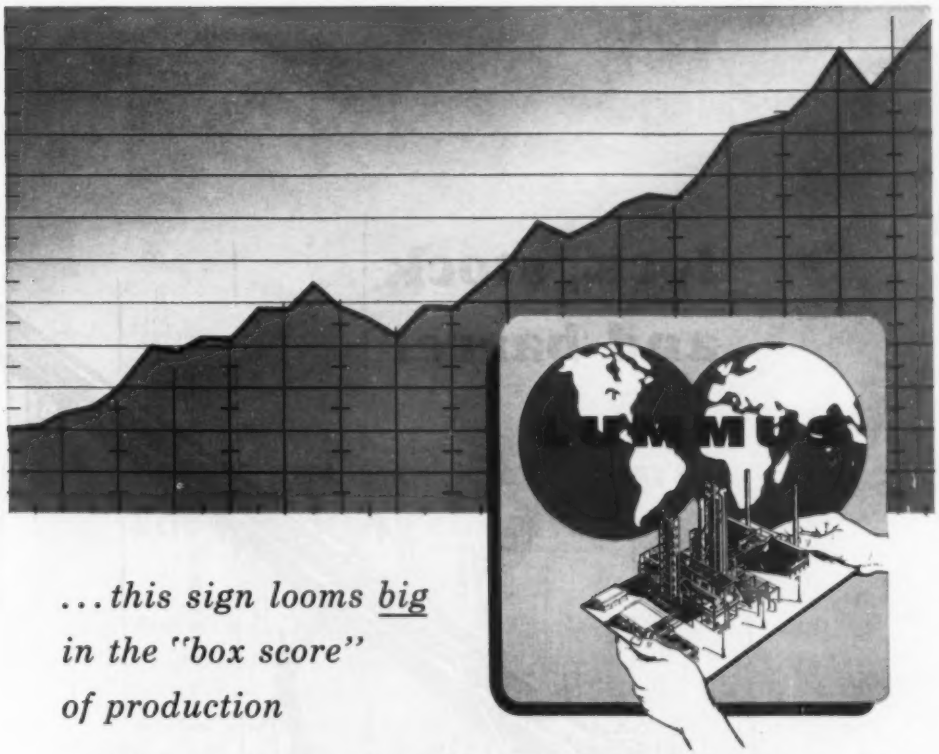

...this sign looms big in the "box score" of production

For better than sixty years the Lummus sign has meant *excellence* in the designing, engineering and constructing of petroleum refineries and chemical plants. It means the same today. And you need take only a short mental jump to see its importance in the days ahead, as oil refiners and chemical producers are called upon to break and re-break production records.

Let's look at a partial "box score" of Lummus' current contributions toward these world-wide objectives. In the U. S. and abroad, Lummus is engaged in seven catalytic cracking projects—as well as in providing alkylation facilities —to meet the record-breaking demand for superior aviation and motor fuels.

Lummus currently has seven ethylene units "on the go" in Europe and the U. S.—plants which will operate with telling effect in supplying a vital basic raw material. One project—the Gulf Oil Corporation unit at Port Arthur, Texas—is the world's largest ethylene unit. It will produce nearly 2½ billion cubic feet yearly, increasing total U. S. production of ethylene by about 12%.

Isn't this a reassuring record for you to tie to? It strongly suggests that you think of Lummus first in your plans for petroleum refinery or chemical plant expansion.

THE LUMMUS COMPANY

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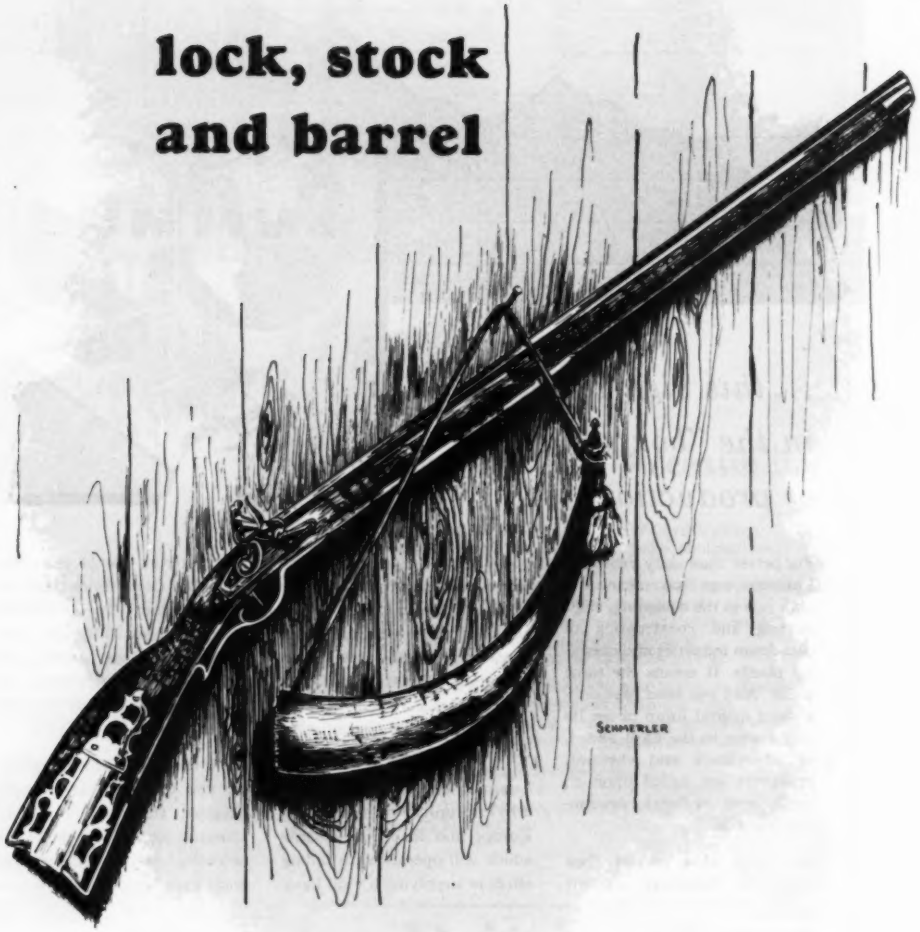
DESIGNING ENGINEERS AND CONSTRUCTORS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

lock, stock and barrel



lock, stock
and barrel

THAT'S ANOTHER WAY OF SAYING UOP SERVICE IS COMPLETE

As old as a museum piece, the meaning of the expression—lock, stock and barrel—is as significant today as it was in the days of the flintlock and powder horn. Handed down from generation to generation, it has become a familiar figure of speech.

In the same way, more and more refiners have come to associate UOP Service with the thought of completeness. And for good reason, too . . . because UOP Service goes all the way—from basic research and process design . . . through engineering, construction supervision, operator training and safety inspections . . . to assistance on normal and unusual problems of daily plant operation.

This complete Service is available to help every refiner operate his plant at highest efficiency and profitability.

UNIVERSAL OIL PRODUCTS COMPANY

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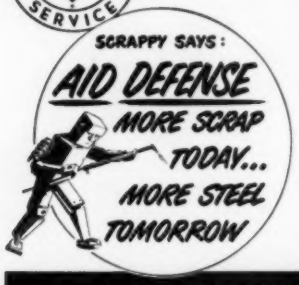
Laboratories: RIVERSIDE, ILLINOIS

Universal Service Protects Your Refinery

NO SCRAP... NO STEEL!

QUALITY
YOUNGSTOWN
SERVICE



THE iron and steel industry faces a serious scrap shortage, growing more critical every day. . . . It will be impossible for producers to make the steel tonnages demanded for rearmament and essential civilian needs, unless consumers cooperate by furnishing *more scrap*. . . Most desperately needed now is heavy industrial iron and steel scrap. . . . Keep the cobwebs from gathering at your own plant by turning in more of your own scrap today.

The Youngstown Sheet and Tube Company

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MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

Pyrene
TRADE MARK

THIS RANGE OF EQUIPMENT INCLUDES MANY DIFFERENT

MOBILE FOAM UNITS

MODELS OF MOTOR FIRE TENDERS DESIGNED TO MEET SPECIFIC REQUIREMENTS FOR OIL STORAGE

INSTALLATIONS AND REFINERIES. THESE RECENT EXAMPLES ARE FITTED WITH PYRENE

MECHANICAL FOAM GENERATORS OR FOAM BRANCHPIPES. FOAM COMPOUND TANKS

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REFLECTION
REFRACTION
DATA REANALYSIS
Southern GEOPHYSICAL COMPANY
SIDON HARRIS, PRESIDENT

Released from the production of War material many far-seeing Engineering Firms have joined in the race to meet the urgent call of Oil producers

The land is cleared

The site is chosen

for Plant and yet more Plant. In this country, Harveys of London have thrown in all their vast resources of men, material and "know how"

A railway is built

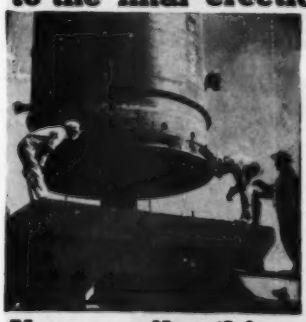
A column arrives

and have so geared production that they are meeting this huge demand with ever-increasing results which will bring benefit to millions.

Off loaded on site

It is gently raised

And so we see, stage by stage, from the clearing of virgin land to the final erection, a history of one of these Fractionating Columns.



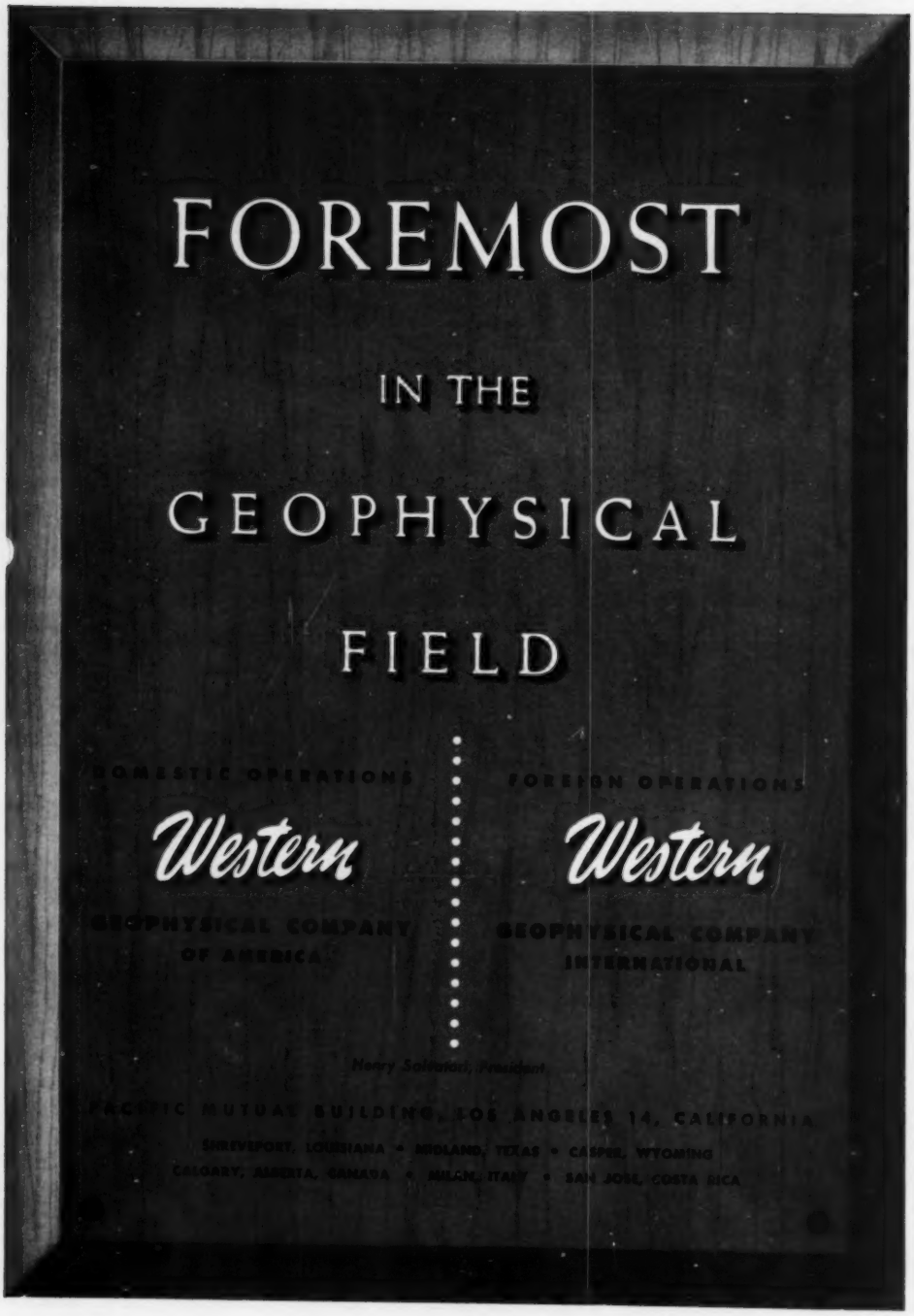
and lowered into position

to start immediate production

Necessarily, this pictorial explanation is much condensed, but even so, it clearly evidences another triumph of British Engineering enterprise.

From the Shell Library come these scenes from various stages in the production and transport of one of these huge Fractionating columns.

G.A. Harvey & Co. Harvey (London) Ltd. Woolwich Road, London, S.E.7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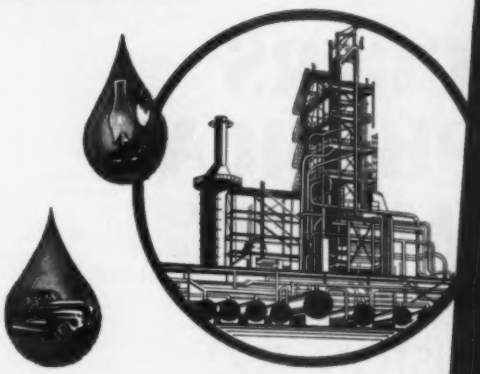
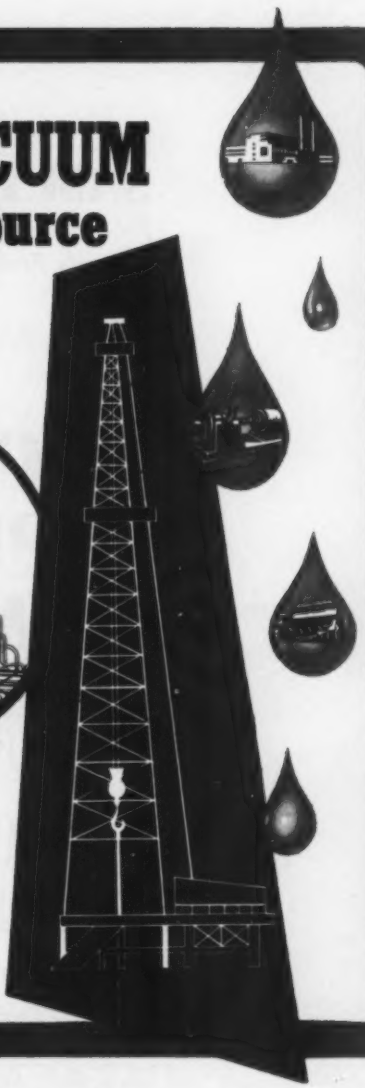
STANDARD-VACUUM

the dependable source for all petroleum products





STANDARD-VACUUM powers, fuels and lubricates the planes, ships and trains... the trucks, tractors and automobiles... industrial machinery, stoves, boilers, lamps, and every other petroleum-using device.

Yes, millions of people throughout the Eastern Hemisphere rely upon **STANDARD-VACUUM** and its affiliated companies—and have, for over half a century.

STANDARD-VACUUM OIL COMPANY

A name that stands for "Progress" in the East

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225,000 bbls/day

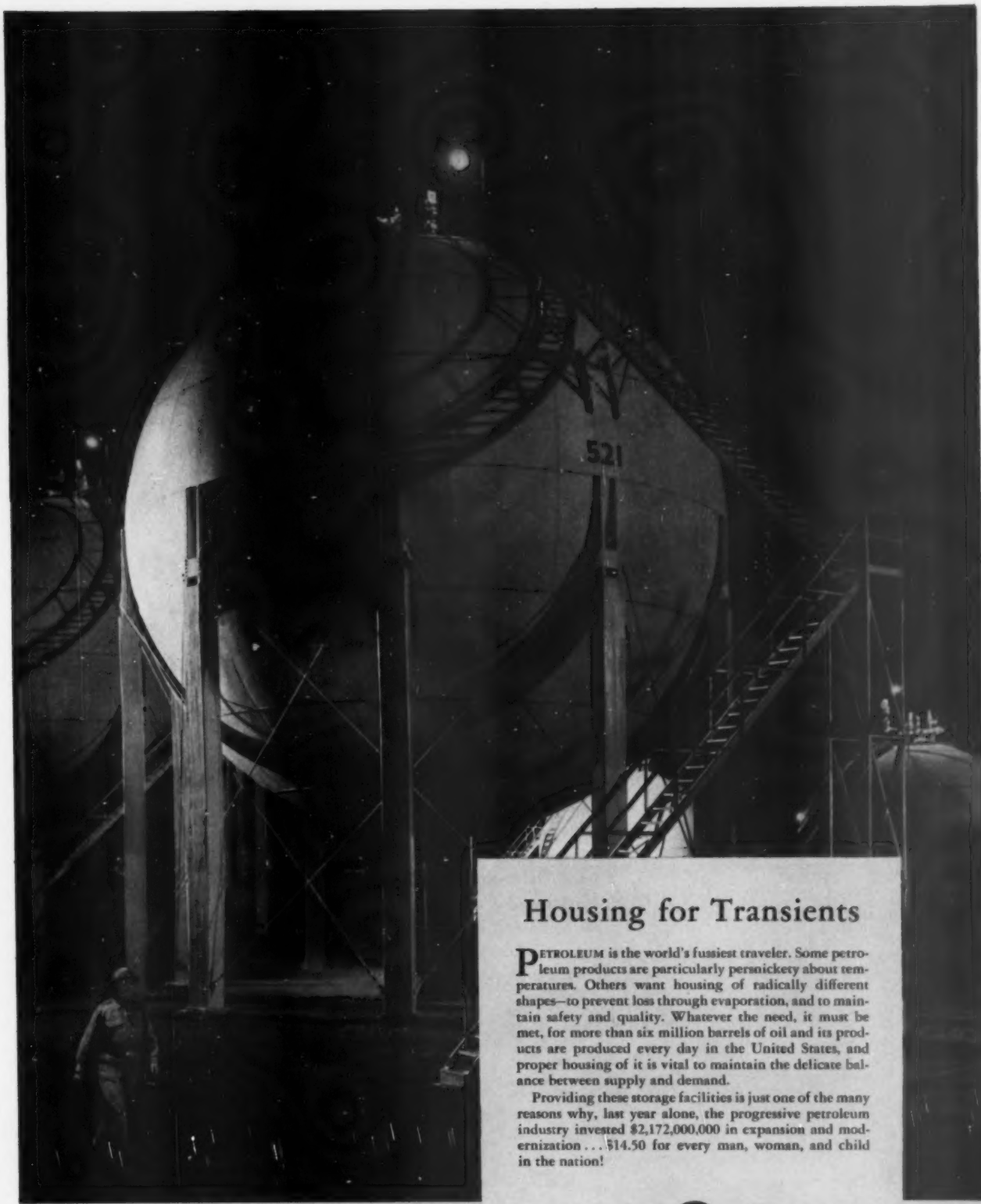
These three crude distillation units, in operation in a Gulf Coast refinery with a combined capacity of 225,000 barrels per day were . . . . . .

designed
and
constructed
by

FOSTER WHEELER

165 BROADWAY NEW YORK 6 NEW YORK

85,000 bbls/day
This unit, the latest of the three shown on the other side of this insert, embodies all the improvements gained from the design and operation of the other two—another example of REFINER-FOSTER WHEELER cooperation.
FOSTER WHEELER CORPORATION
165 BROADWAY, NEW YORK 6, NEW YORK



Photograph by Anthony Linck
at Cities Service Refinery, Lake Charles, La.

Housing for Transients

PETROLEUM is the world's fussiest traveler. Some petroleum products are particularly persnickety about temperatures. Others want housing of radically different shapes—to prevent loss through evaporation, and to maintain safety and quality. Whatever the need, it must be met, for more than six million barrels of oil and its products are produced every day in the United States, and proper housing of it is vital to maintain the delicate balance between supply and demand.

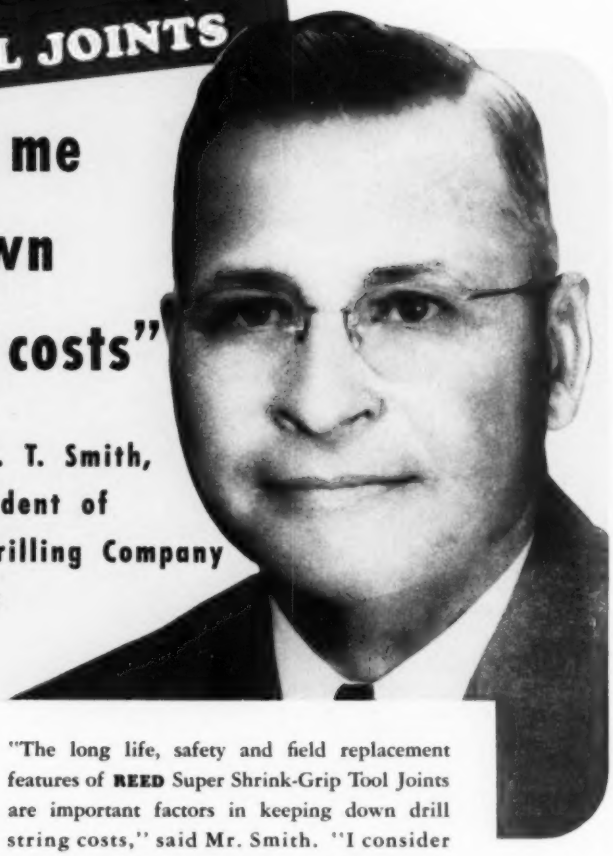
Providing these storage facilities is just one of the many reasons why, last year alone, the progressive petroleum industry invested $2,172,000,000 in expansion and modernization . . . $14.50 for every man, woman, and child in the nation!

CITIES SERVICE

REED
Super Shrink-Grip
TOOL JOINTS

"They help me keep down drill string costs"

...says V. T. Smith, Vice President of Quaker Drilling Company of Kansas



"The long life, safety and field replacement features of **REED** Super Shrink-Grip Tool Joints are important factors in keeping down drill string costs," said Mr. Smith. "I consider economies like this necessary to the successful operation of a drilling business."

REED ROLLER BIT COMPANY

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3041

Gulf Coast, Mid-Continent, Rocky Mountain and Canadian Distributor for Martin-Decker Products

If SOUR CRUDE is your problem

The Tannin Solutizer Process* may be your answer

As MORE AND MORE SOUR CRUDE must be refined, the advantages of this mercaptan-removal process become increasingly attractive.

This is the process that replaces doctor treating and reduces TEL requirements . . . without affecting either the quality or the stability of the treated gasoline.

Converting to the Tannin Solutizer Process requires a minimum investment in new equipment . . . very likely your present equipment will serve with little change.

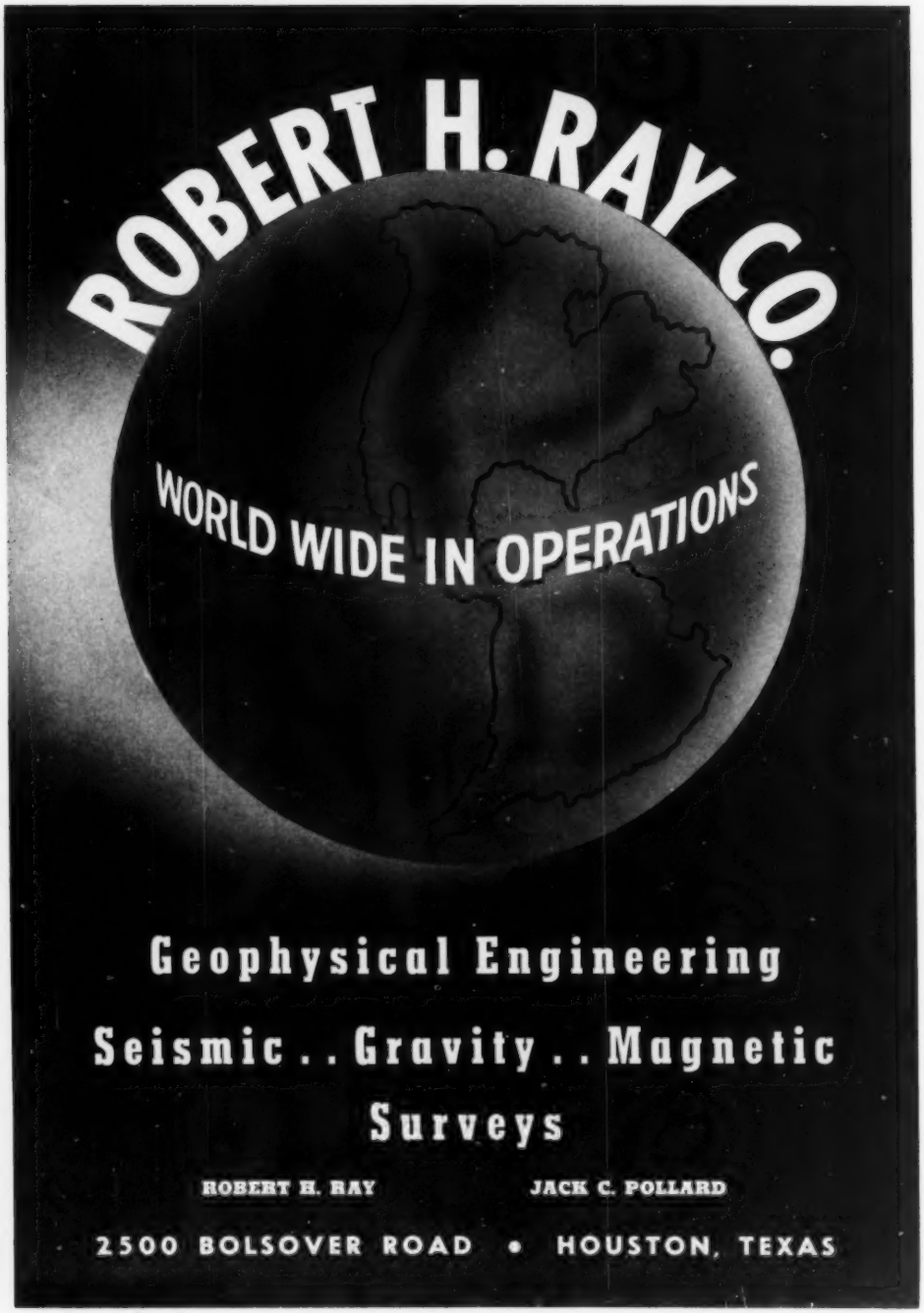
Operating economy is an outstanding advantage of the Tannin Solutizer Process . . . *this process is not corrosive*, does *not* require equipment of special alloys.

Complete engineering service is available . . . to help plan your unit, to supervise start-up, to assist in later operation if required. We welcome the opportunity to work with you in extending the benefits of the Tannin Solutizer Process.

*The Tannin Solutizer Process is licensed under the patent rights of Socony-Vacuum Oil Company and Shell Development Company.

SHELL DEVELOPMENT COMPANY
50 WEST 50TH STREET • NEW YORK 20, N.Y.

SHELL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BURTON DELINGPOLE FLANGES

SOLID FORGED WELDLESS STEEL
HIGH PRESSURE FLANGES

BURTON DELINGPOLE & CO. LTD. OLD HILL, STAFFS., ENGLAND
TELEPHONE : CRADLEY HEATH 6237-8 TELEGRAMS : STAMPINGS, OLD HILL

A fine seam

A fine seam in 14 gauge metal needs more than a needle. For this work you need a machine by Moon. In fact, for any operation in metal box or drum manufacture, you can't beat a Moon machine.

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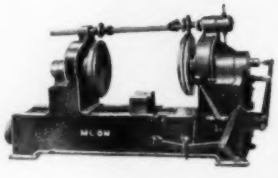
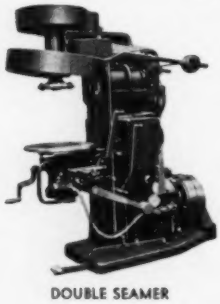


DRUM FLANGER



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This machine is used for cutting circular blanks for drum and keg ends. Fitted with dual-sprung clutch, safety treadle and triple contact rocking key.

DRUM FLANGER MODEL G.F.

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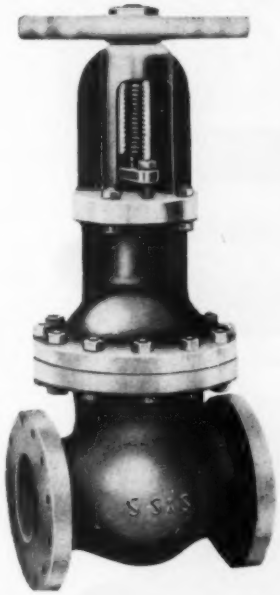

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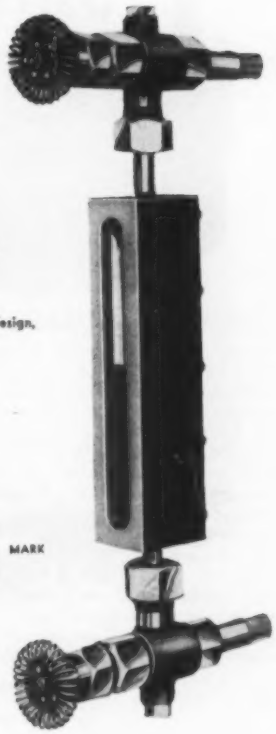

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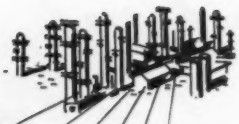
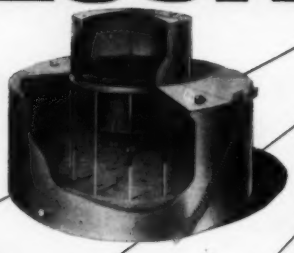
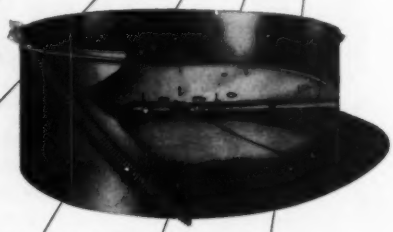


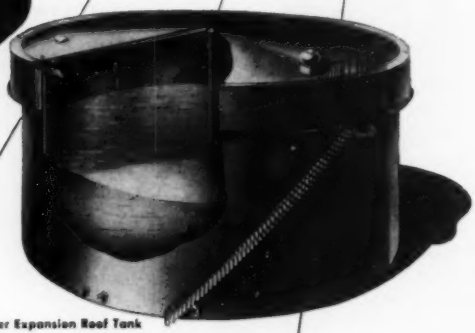


● Graver Vapor-Mixer



● Graver Double Deck Floating Roof Tank

● Graver Center-Weighted Floating Roof Tank



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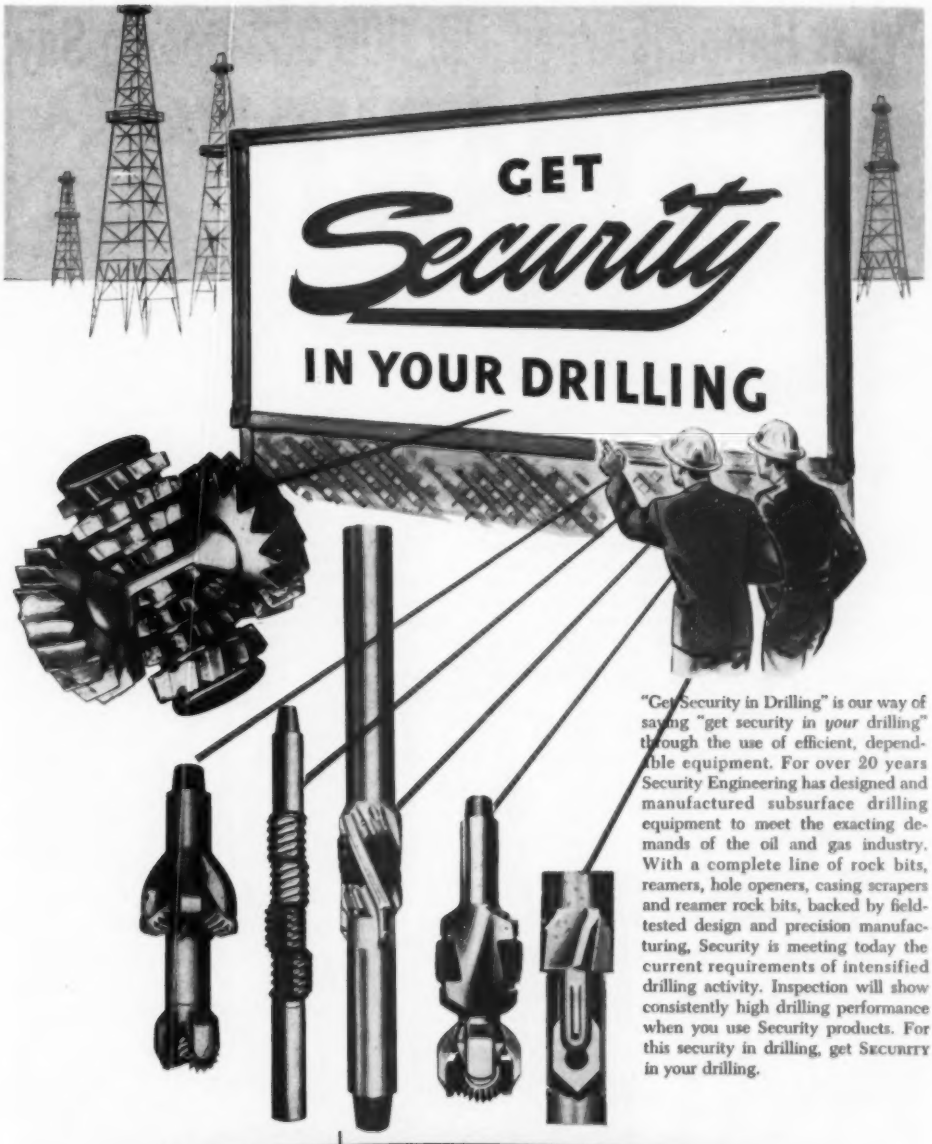

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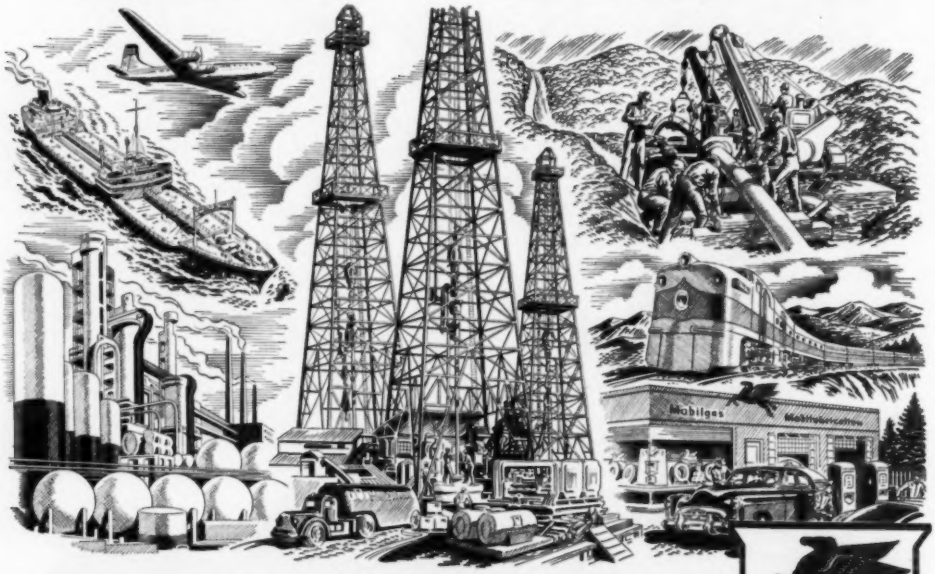

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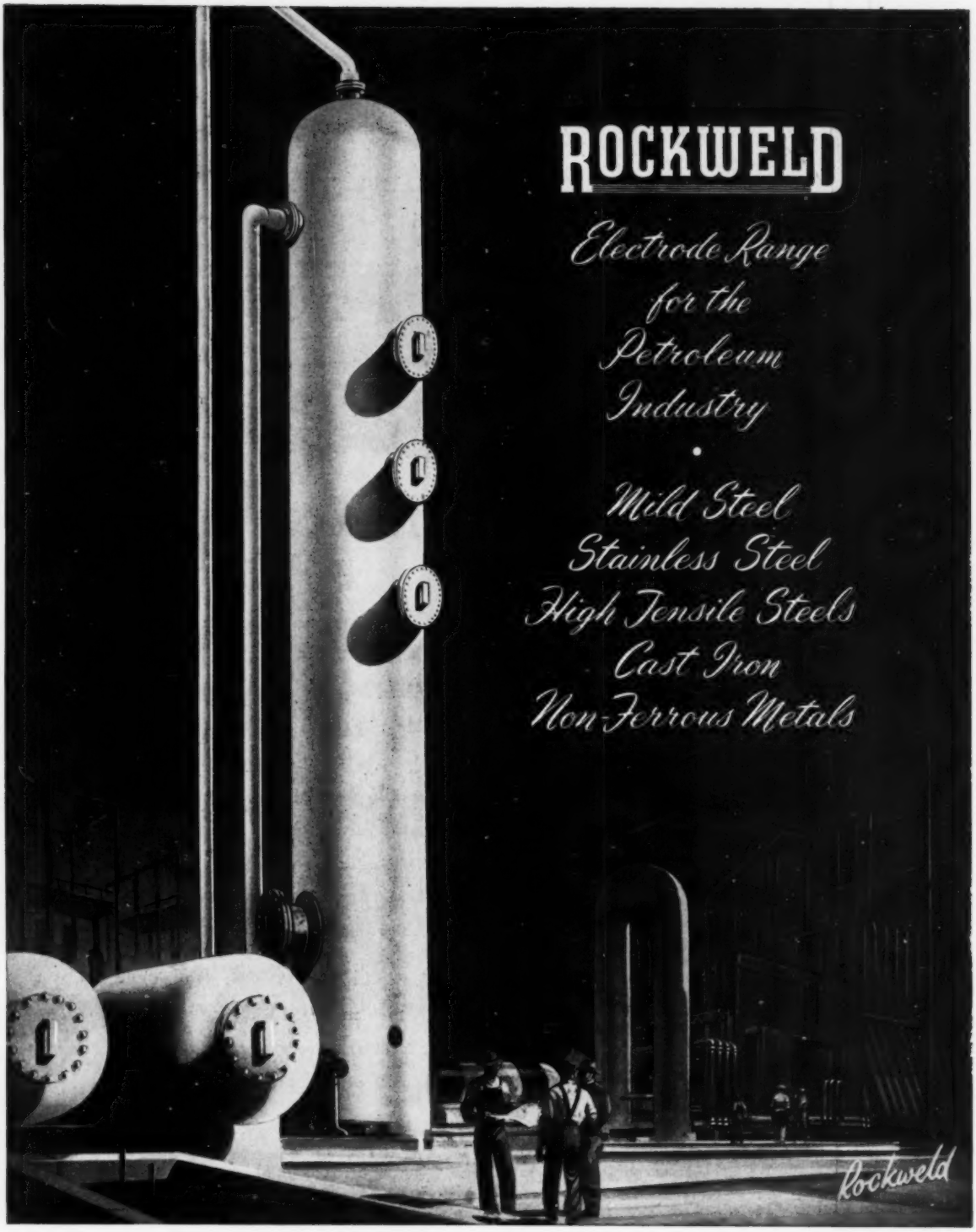

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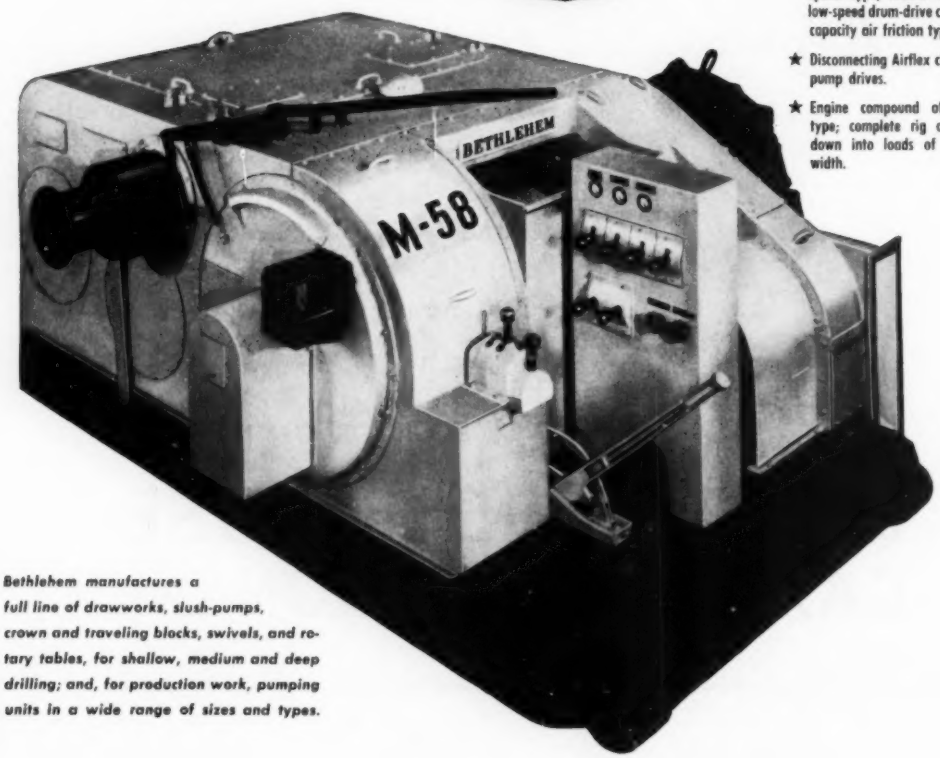

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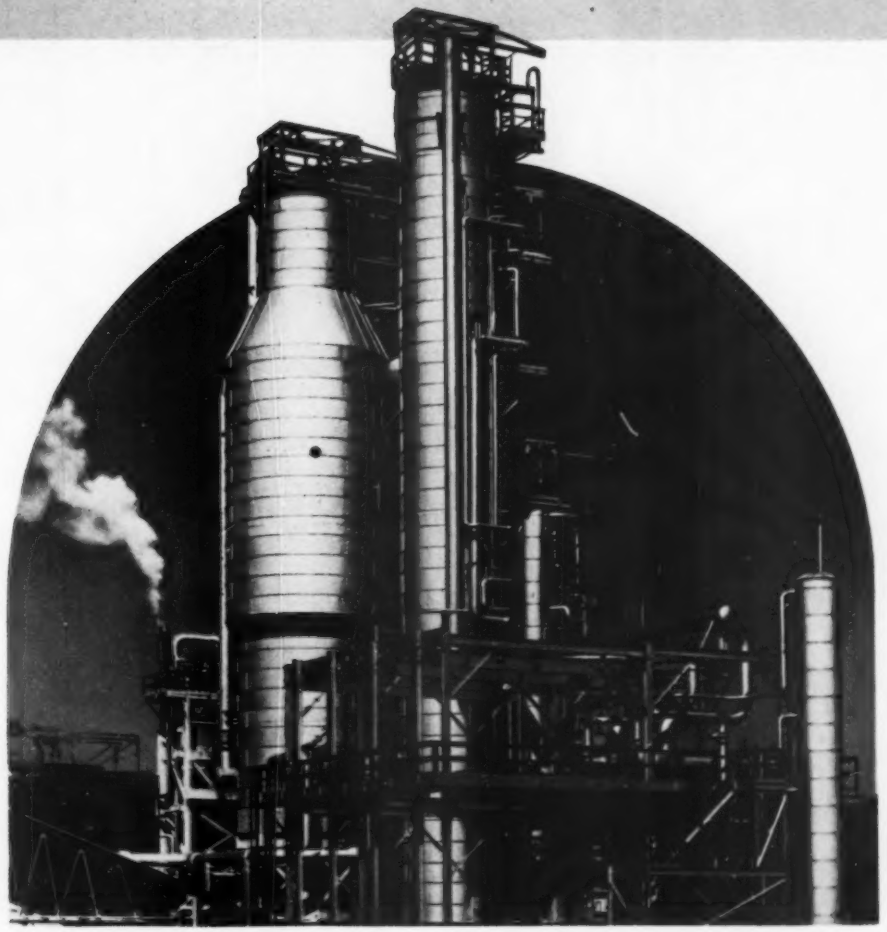

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From a speech by Eugene Holman, President, Standard Oil Company (New Jersey), June 3, 1946

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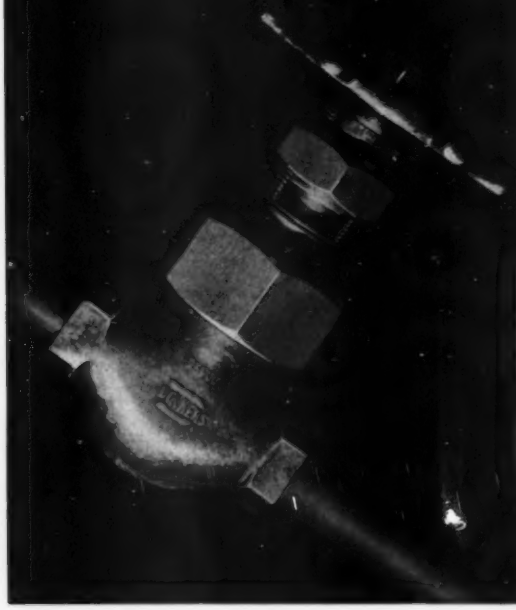

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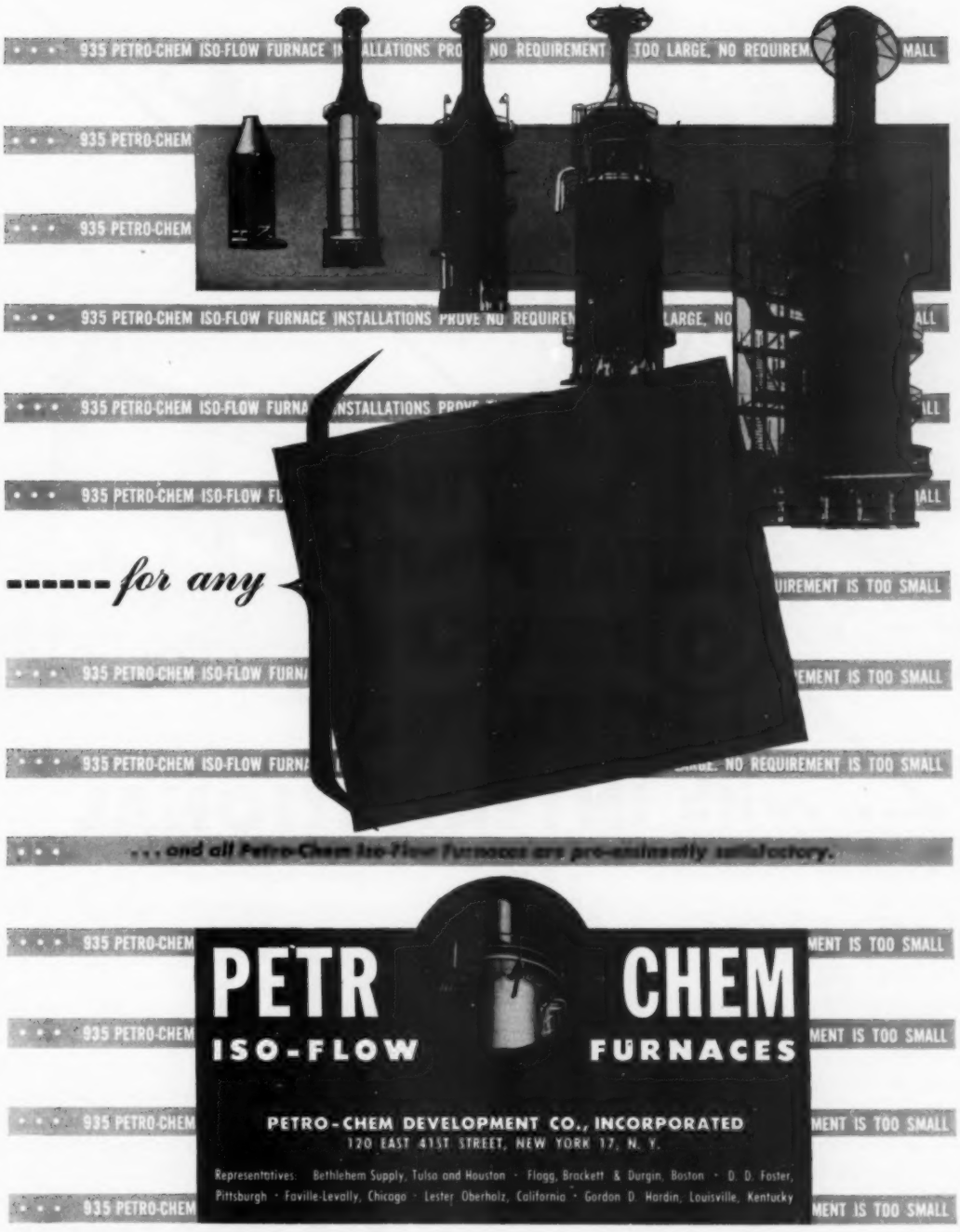
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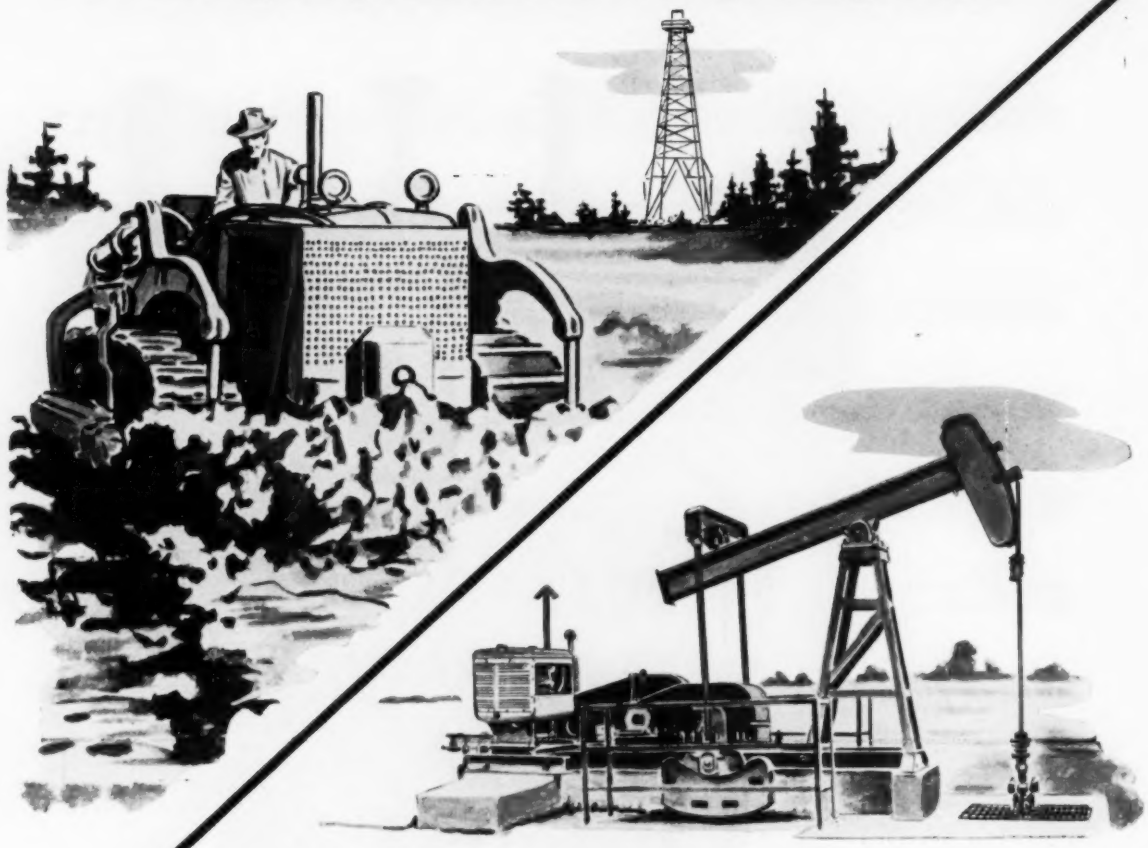

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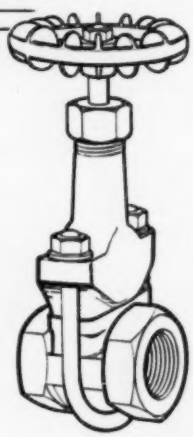

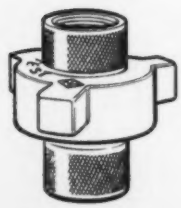

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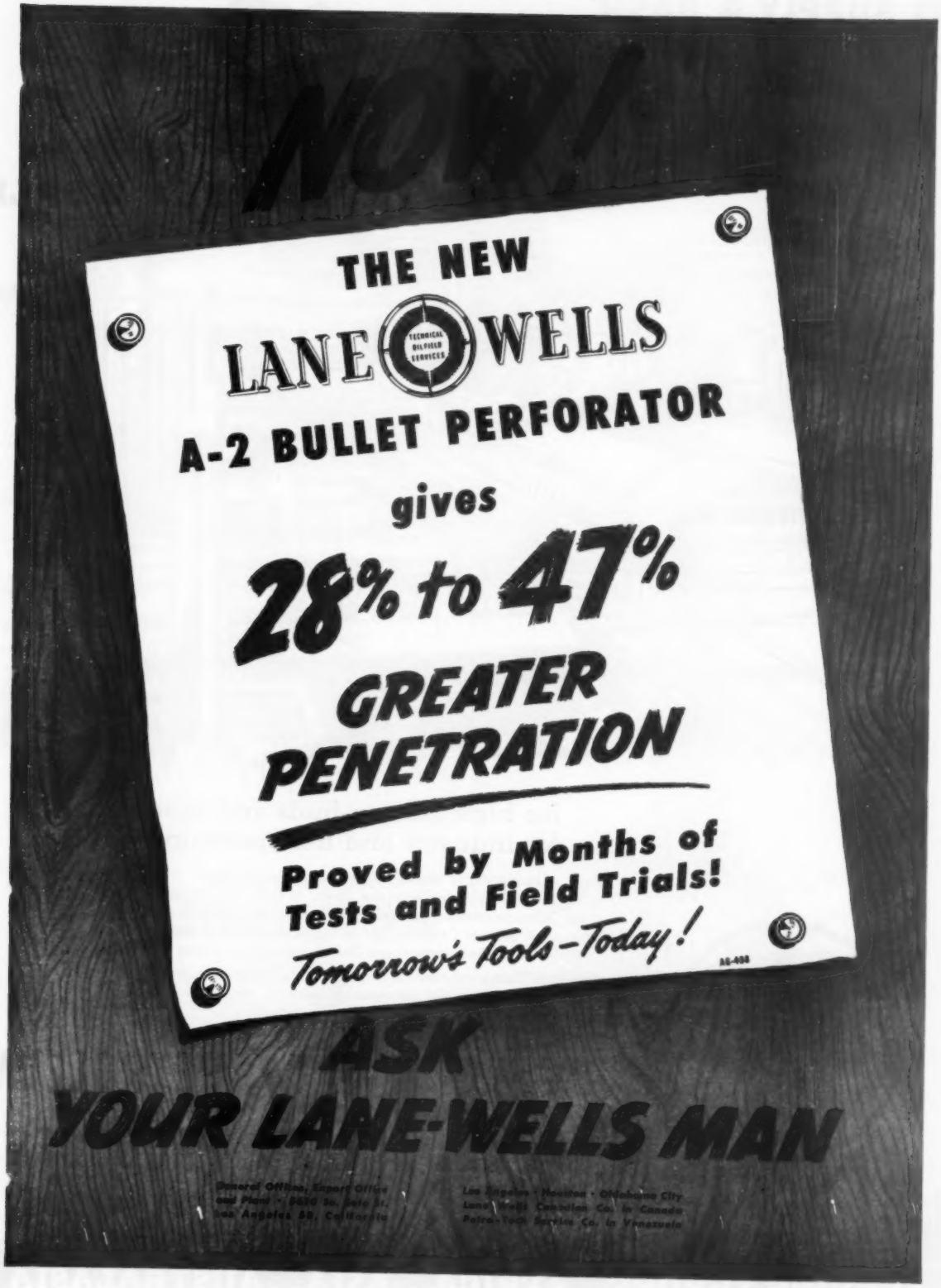
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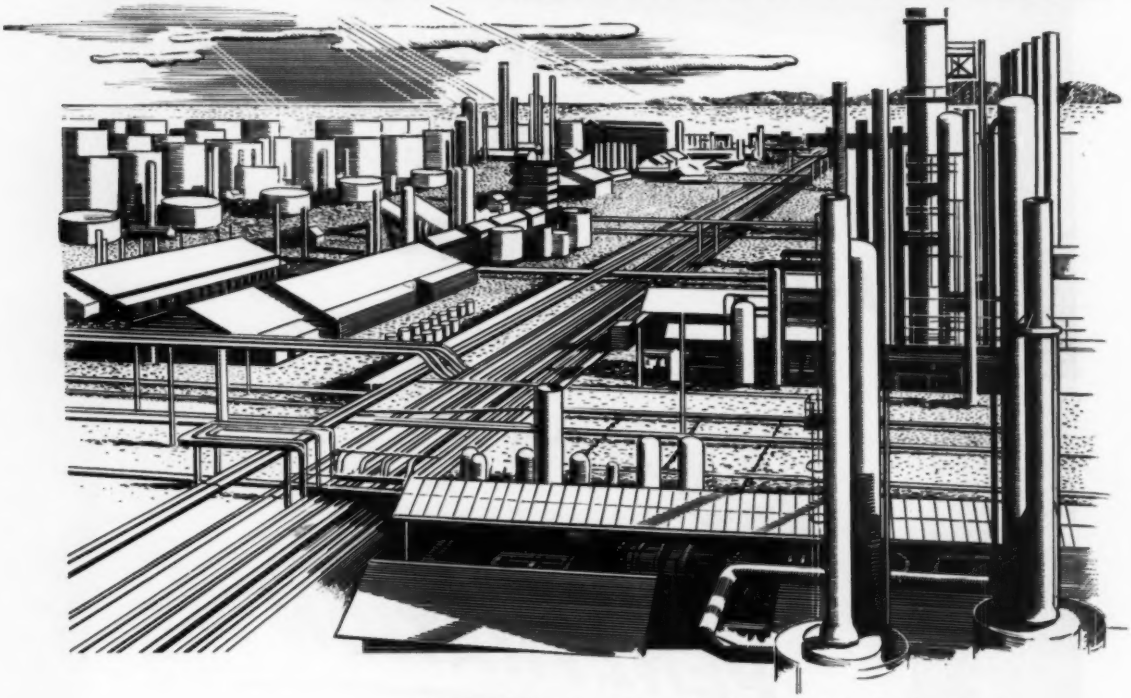

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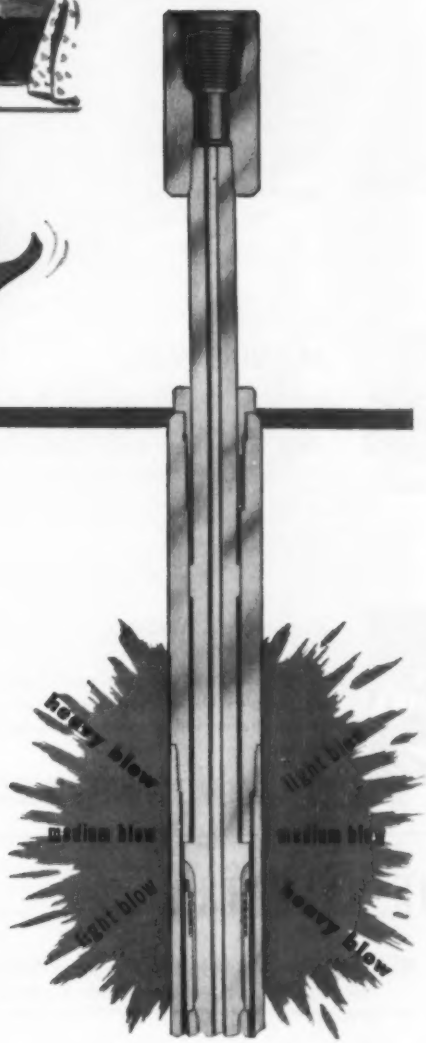

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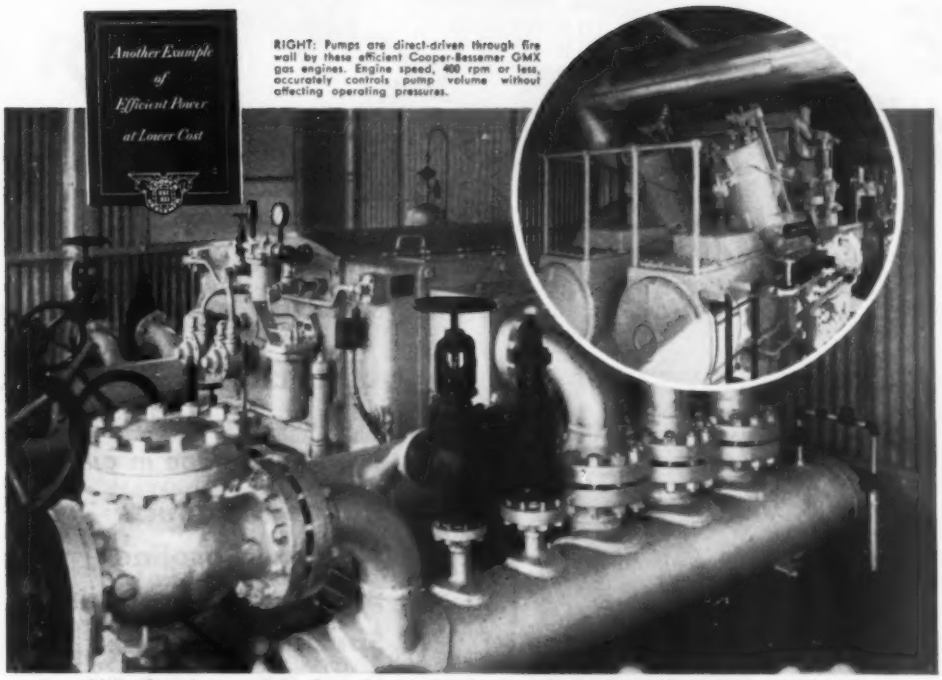
RIGHT: Pumps are direct-driven through fire wall by these efficient Cooper-Bessemer GMX gas engines. Engine speed, 400 rpm or less, accurately controls pump volume without affecting operating pressures.



ABOVE: One of two 6-cylinder Cooper-Bessemer Twin-Line pumps handling lean oil for methanizing and high pressure absorbing at Sun Oil's Starr County Gasoline Plant.

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The Management Publication of the International Petroleum Industry

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Art Director

SUBSCRIPTIONS
Annual subscription $5.00
(U.S.) postpaid
Single copies $1.00

GENERAL OFFICES
2 West 45th Street, New York 36
(Tel. MUrray Hill 2-7333)

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(Tel. MUrray Hill 2-7333)

TULSA 3
O. F. Cosier, Mid-Continental Advertising
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World Petroleum is published by Mona Palmer,
Trustee under the will of Russell Palmer.

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THIS MONTH'S COVER

Pictured on this month's cover is a modern off-shore drilling operation of the newer type in which platform costs have been minimized. The painting was done in casein by Jack Cowan, staff artist of Laughlin-Wilson-Baxter & Persons, advertising agents for Dresser Industries, Inc., Dallas, Texas. Color plates are reproduced through the courtesy of the Dresser group of companies.

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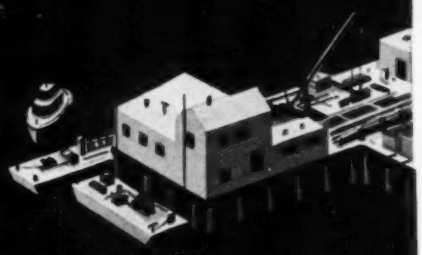

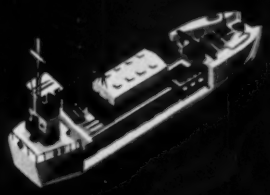

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Industry's Growth Brings New Problems

As an industry or a business grows in the extent and volume of its operations, there is a corresponding increase in responsibility. Power has its rewards but it also brings new and complex problems. This is the lesson that the petroleum industry has been learning in the course of its rise from a collection of local enterprises serving a useful purpose within a limited sphere to a position in which it is a primary factor in all peacetime industrial progress and determines the fate of nations in the arbitrament of war.

Paeans have been sung in praise of the oil industry's achievements in many fields. It is credited as a main factor in the winning of two world wars; there is acknowledgement that it has been instrumental in revolutionizing the habits and way of life of peoples in many parts of the world and in multiplying many fold the productive capacity of human skill and effort.

Members of the industry feel a modest pride in its record and particularly in the fact that it never yet has failed to meet every requirement placed upon it, no matter how unexpected the demand or how dire the emergency. The record is long and honorable. Oil met the test of World War I when liquid fuels assumed their first important part in military operations on land and sea, and in what now seems a very limited fashion in the air. At that time, when the United States was the source of two-thirds of the world's supply, the numerous components of the American industry joined together for the first time to serve a common need.

In the following two decades the industry underwent a period of remarkable development. It was marked not only by a doubling of production in response to swiftly rising consumption, but saw also the introduction in rapid succession of new processes and improved methods that led to the better utilization of its raw material, the improvement in quality of its output and the discovery of a host of new uses and end products. During this same era there was a great extension in the industry's productive area, not only in the United States but in other quarters of the globe, that brought new regions into prominence in the international picture and made petroleum geographically as well as commercially a world industry.

World War II brought another big test of the industry. Its achievements during these critical years are recent enough to be familiar. Since the termination of that conflict, which actually has ended only insofar as open hostilities are concerned, the industry has kept pace with a fresh upswing in worldwide demand.

Within the past several months the industry has provided a new example of its ability to cope with unexpected situations by the speed and success with which it met the seizure of Anglo-Iranian properties by the government of Iran, cutting off, practically without warning, more than 600,000 barrels of the daily international supply, including the output of the world's largest refinery, amounting to nearly a half million barrels per day. Here again, it was a case of united action by leading factors in the industry and a marshalling of their resources that made possible the prompt filling of the gap with no serious interruption among industries that had been dependent upon Persian oil. This incident emphasizes once more the global character of today's oil industry and points up the fact that the security of the free world calls for united action in protecting the sources of its petroleum supply.

All of the tremendous progress that has been made in bringing the oil industry to its present high position has been accomplished by individual effort operating under the system of free enterprise. Where this system has enjoyed full play, the industry has grown and flourished; where it has been denied, progress at best has been halting. The very growth and spread of the industry, however, combined with restrictions upon its freedom of operating and a burden of taxation that discourages investment, raise new and difficult problems affecting its future.

Fortunately the industry has been able to finance a large portion of its capital requirements from its own resources by reason of the policy generally followed of reinvesting a large proportion of its earnings to provide for future expansion. Now capital requirements and operating costs both are rising at a disturbing rate. Expert calculations indicate that the cost of finding, transporting and processing a barrel of oil are nearly twice as great as in the pre-war period. At the same time the availability of outside capital is becoming less. Financial authorities inform us that whereas formerly an average of 28 percent of industrial income was reinvested for new development, the proportion now has been reduced to 16 percent. This compilation relates of course to the industrial situation as a whole, and not merely to oil, but it indicates the trend in general.

Taxation is of course a substantial factor in this change. The oil industry is a favorite target of fiscal authorities, and even now is subjected to double or triple imposts on portions of its earnings. The outlook is that the tax burden will grow heavier rather than lighter during the immediate future.

Another threat to which the oil industry must always keep alive is that of hampering government interference with its operations. There is something about the nature of the oil business that seems to exercise an irresistible attraction to the professional bureaucrat in spite of the accumulated evidence of government ineptitude in attempts at its operation. Eternal vigilance on the part of the industry's own members is the price of freedom from this threat.

Petroleum And Security

"KNOWLEDGE is power," said Francis Bacon, first modern exponent of the need for a free exchange of scientific information among free men. Sir Francis might have added that knowledge *of* power — the power hidden in a drop of oil, for instance— if exchanged by scientists of the free world, makes that world invincible.

Such thoughts grew inevitably out of the Third World Petroleum Congress that I attended at Scheveningen, Holland, last summer. That meeting, largest of its kind ever held in Europe, was attended by 2,500 petroleum experts from 44 countries on our side of the Iron Curtain. Delegates spent a full week exchanging information. I came away from the Congress convinced that, despite the Korean war, possible loss to the West of Iran's oil, and other equally grim international events, democratic nations need not fear being overwhelmed by dictator-ridden peoples with closed and regimented minds.

I tried to express these thoughts during a brief address at The Hague on May 31. Since my opinions have not changed in the interim I am going to repeat them almost verbatim. In that talk I cited the immeasurable value to all mankind of the work and achievements of the Congress, said the meeting was a perfect example of international cooperation for the benefit of humanity, and added:

"Here we are priviliged to learn of the technical discoveries and advances, the experimental studies and the activities of the world oil industry. Here free men meet to exchange ideas and information, all for one purpose, the advancement of civilization.

"The exchange of knowledge which has characterized these Congresses sets the example which could point out the road to world peace, for here is exemplified one common purpose, to serve people, not selfish ends or lust for power."

After pointing out that the wise and far-flung use of petroleum products has made the oil business truly international in scope, transcending all boundaries and barriers, I went on:

"Oil operations in today's world are no longer confined to a few countries. They are spread across both hemispheres and among many nations, so that what happens in one part of the oil world must have its effect in some measure on every other part.

"Today we cannot think of the industry in our own particular country as a unique, separate entity; it is definitely an interdependent segment of a world-wide industrial enterprise dedicated to a never-ceasing effort to better man's welfare and lighten his burdens.

"There are no longer any geographic boundaries to the activities of the petroleum industry. There can no longer be any geographic boundaries to our thinking and our action in regard to these activities.

"Neither are there any boundaries in our technology and research activities. The importance of these fields to the rest of our industry cannot be emphasized too strongly. They have made a priceless contribution to industrial and everyday life. Upon them rest our hopes for new and better fuels, for the improvement of all petroleum products, and for inventions in the future even more amazing than those of the past. The frontiers of science are ever expanding into the unknown, and the work of science is never done."

I still feel that science and technology can flourish only in a society in which there is intellectual freedom, freedom of enterprise and freedom of expression. Those conditions stimulate the best efforts of thousands of individuals to pursue independent paths of inquiry, unhampered by centralized control.

Every oil man who returns from Europe these days is asked a lot of pointed questions about the world fuel situation, and I have had my share. The most pertinent have been: What is the oil production of Russia and other Iron Curtain countries as compared with ours? And, can the military defenses and civilian economy of the United States stand the strain of helping to fill the gap caused by the loss of Iran's oil?

Nobody really knows what is going on, otherwise, in eastern Europe and large parts of Asia. There are only guesses, based on information dating back as far as the late 1930's. Those guesses indicate that the United States is out-producing Russia eight to one—1.9 billion barrels here last year as against 275 million barrels for the Soviets.

That doesn't tell the whole story, however. We don't know what Russia's production of synthetic liquid fuels is. We don't know what her civilian consumption is, or, to put it another way, what percentage of her total production can be used for military purposes, in case of war. We don't know what the production of her satellite countries is, though it may be significant that Romania has reportedly offered to sell 200,000 tons of crude oil to the Anglo-Iranian company.

As to the entire Iranian situation, it can only be described, at this writing, as uncertain. Since we do not know what we shall be able to count on from that direction, we would do best to count on nothing at all, and develop our own reserve capacity as rapidly as possible.

In this connection it is encouraging to note that, in the past couple of years, the world-wide oil industry has been keyed up to provide added supply capacity to cover increases of more than a million barrels daily. With this record, there seems to be little doubt that, over the long-term, Iranian losses can be replaced. Developments to date on the shorter-term picture have resulted in very nearly covering the Abadan shortage through the remainder of this year. (Aviation gasoline is a possible exception due to a recent sharp increase in military requirements). A somewhat more difficult position may be met in the first quarter of next year during the season of peak demand, but even during this period a reasonably satisfactory job of coverage should be possible.

Irritating though the Iranian crisis may be, the big problem of the American oil industry still remains that of expanding fast enough to keep up with our civilian domestic demand. Military requirements are increasing rapidly, but they still make up only a small percentage of total demand.

The American oil industry is prepared to meet normal increases in domestic demand, even though these have gone up 75 percent since the beginning of World War II and even though the United States consumes more oil than it produces. Gasoline stocks are adequate to the extent that there appears to be no concern as to the prospects of rationing in this country. And, no matter what emergency may arise, it is generally conceded that our armed forces will not lack for the vast quantities of oil products needed to keep them in efficient, hard-hitting operation.

W. Alton Jones, president of Cities Service Company and chairman of the board of directors of the American Petroleum Institute, who will preside at general sessions of the 31st annual meeting of the Institute. He will introduce the special guest speakers, including Oscar L. Chapman, Secretary of the Interior and Petroleum Administrator for Defense; General of the Army Omar N. Bradley, chairman of the Joint Chiefs of Staff; and Gov. Allan Shivers of Texas.

In A Free World

By Frank M. Porter, President, The American Petroleum Institute

Taxation's Threat to

STRANGELY enough, most oil men seem scarcely aware of the most serious threat their industry faces, the threat of a force which in time could undermine their jobs and sabotage their wells, their pipe lines, refineries and service stations.

We speak of a tax measured at present, like the federal budget, in billions—yes, billions—of dollars. The annual tax bill on the petroleum industry and its products now stands at $3,700,000,000.

That, Mr. Engineer, Mr. Driller, Mr. Chemist and Mr. Salesman, is the dollar and cents figure for the energy and wealth you and your customers turn over to government each year just because you are engaged in or deal with the oil industry.

Admittedly, all forms of taxation have in recent years been on the rise. But, unfortunately, petroleum operations and products lend themselves to sugar-coated taxation, too often leaving the victim completely unaware of the real bitterness of the pill he has swallowed. Though sugar coating may sweeten the dose, it makes it no less harmful, particularly when the taxes are levied on an industry as vital as the oil industry and a product as basic as gasoline.

To escape luxury taxes, smokers can stop smoking, drinkers can stop drinking, and night-club gadabouts can stay home and listen to the radio. But is there a single person who does not in some manner, directly or indirectly, depend on the use of the gasoline engine?

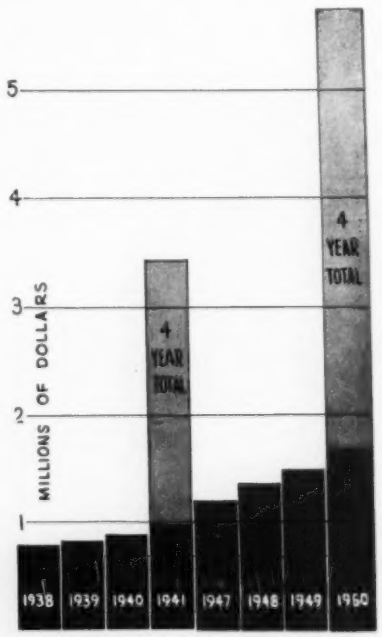
This source of energy has come to occupy its high place in the economy because it is cheap and efficient. The ever-mounting tax load heaped on the millions of persons who find, manufacture, sell and use petroleum products is, however, making such means of energy less economical year after year.

It is no mere figure of speech to say that uncontrolled taxation can wipe out jobs and entire businesses: remember, "The power to tax involves the power to destroy." Whether the destruction be intentional or from lack of foresight makes little difference. Taxing authorities at all levels, municipal, state and federal, must be made aware of the danger of destroying a principal force that powers the American economy.

The rise and fall of empires, kingdoms and nations through centuries of painful progress have told and retold a story that apparently all too often falls on deaf ears, the story of how vigorous and vital governments weaken and disintegrate under the impact of misguided taxing policies.

Throughout the centuries one government after another has brought about its own downfall by imposing higher and higher tax exactions. The result has been economic chaos and often revolution. Taxes in various parts of the old world reflect this trend today.

In just one field of taxation abroad, a field close to the oil industry, are found some disturbing facts: although the people of the world outside of the United States comprise 94 percent of the population, they own less than 25 percent of the world's automobiles and less than half the trucks and busses. In the United States there is a motor car for every four people. Great Britain has one car for every 22 people. France has one car for every 27 people, and Italy has only one car for every 176 people. Many factors account for Europe's lagging so far behind the United States: lack of mass production methods, inferior facilities, less raw materials. These, however, are merely the obvious, surface considerations, all of which are aggravated in Europe by economic restrictions traced directly to a system of excessive taxation. Taxation as applied in some of these old world countries discourages mass production, hampers research to develop better techniques, and slows down the exploitation of raw materials.



Motor fuel tax revenues, pre-war and post-war.

In addition to the high level of general taxation, the special direct taxes in the automotive field present a most formidable picture. Incredibly high taxes on the purchase of an automobile are levied in many countries. In Great Britain, for example, the purchase tax on a medium-priced car equals a third of the retail price. On more expensive models the tax runs as high as two-thirds of the price. In addition, registration fees run three times higher than the United States average.

Even more excessive proportionately are European taxes on gasoline. In Great Britain, sales taxes add about 75 percent to the retail price of motor fuel. In France, they add over 100 percent and in Italy more than 200 percent. Such excessive, unreasonable taxation has helped to keep the automobile a luxury, with the result that the majority of Europeans are deprived of a most efficient means of transportation. And the present world emergency emphasizes that superiority in transportation enhances a nation's ability to fight for survival.

For a long period the remarkable development of automotive transportation in the United States went hand in hand with fair and intelligent taxation. However, in recent years, automotive taxes have climbed rapidly until today they take 24 cents out of every automotive dollar. Taxes on gasoline now amount to a third of the retail price.

How far can this dangerous trend go before a large segment of the population is priced out of the market, production crippled and the automobile returned to the status of a luxury product? By raising tax levies to unreasonable heights the very purpose of automotive taxation can be defeated to the accompanying hardship of the country and its people.

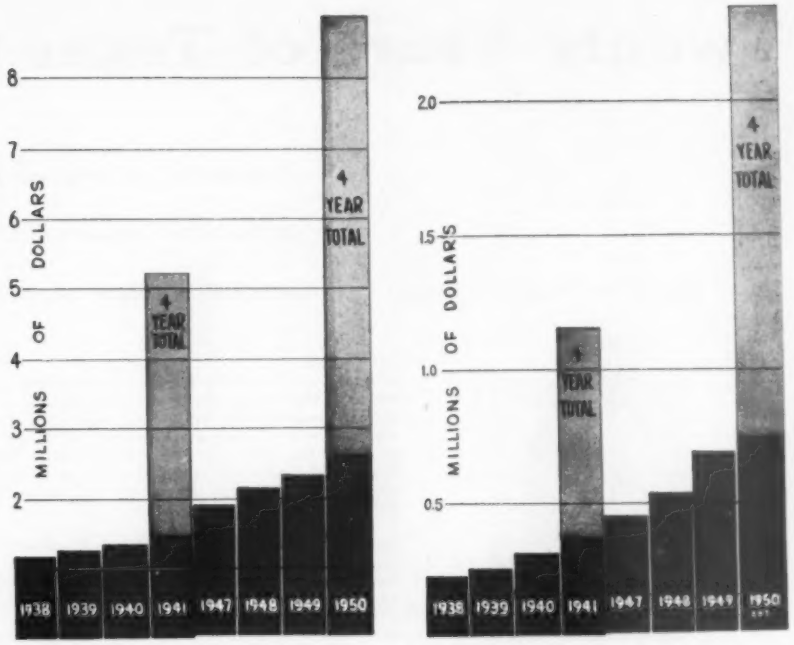
The economic collapse of the United States, if and when it occurs, will come about because too few persons have understood the lessons of history. The "Decline and Fall of American Democracy," should it be written by some future Gibbon, may tell the story of twentieth century Americans who remained blind to the danger facing them. The story would recount how Americans, though seeing and even complaining about continually increasing taxes, seemed incapable of making any successful moves against the tax cancer that was sapping their own strength.

With the prospect of such grim reading facing our descendants, let us examine the present tax level on the industry and its products, and perhaps we can gain an insight, too, on why these taxes seem due, if present trends continue to reach ever new heights year after year.

Most of our tax troubles arise not so much from the theories underlying the levies as from the use, or misuse, to which the revenue

Industry

By General Baird H. Markham*



At left, state highway user tax revenues, pre-war and post-war, contrasted with expenditures for state highway construction from highway user taxes, pre-war and post-war, at right.

they generate is put. This, in turn, has a direct bearing on how heavy a tax load is saddled on oil men and oil consumers. The billion dollar business of spending gasoline tax funds can go awry in two principal ways: one is called diversion, the other dispersion.

Diversion means taking motorists' road tax revenue and spending it for general government purposes. This practice hits directly at the petroleum industry, whose customers thus are over-taxed in order to support governmental services which benefit the non-motoring public as well. Motor tax revenue should be reserved for road use, and the rate of motor vehicle taxation should be determined by the needs of progressive and integrated highway systems. But too often, unless expressly prohibited by a state constitution, surplus road revenue is used for other governmental purposes. Those who thus divert such earmarked funds to other uses try to minimize the adverse effect of such action on the economic life of their community or state. They refer to the gasoline tax as "pennies per gallon," conveniently ignoring the fact that these pennies actually mean millions and millions of dollars a year.

Thus, diversion is simply a form of injustice similar to that which in past years has been employed in many communities where the profits from a municipally-owned electric power plant are used to finance all city operations. Just as this practice unfairly measures a citizen's share of government cost by the amount of electricity he consumes, so diversion of gasoline tax receipts measures each citizen's share of government cost by the amount of gasoline he buys.

What has been the cost of highway tax diversion? Authorities have estimated that since 1925 more than three billion dollars of automotive tax revenue, tax money paid by motorists ostensibly for road purposes, has been diverted to other uses. In many states this modern form of highway robbery has brought about road deficiencies which are then used as a lever for even higher automotive taxes.

A classic example of diversion is Rhode Island, where the problem is perhaps exaggerated, but nonetheless important, because of the small area of the state and the relatively high proportion of motor vehicle ownership. Over the years, Rhode Island has diverted the equivalent of almost its entire collections from the state gasoline tax. The state could have financed practically all highway expenditures from motor vehicle fee receipts alone.

But it is not only the smaller states which have singled out gasoline consumers for such discriminatory tax treatment. New York State, most populous in the country, has diverted more than $800,000,000 in highway revenues and this year's total alone may exceed $100,000,000.

On the other hand, encouragement is to be drawn from the fact that steady progress against diversion is being made in many parts of the nation. To date, 21 states have adopted constitutional amendments protecting their highway treasuries against the ravages of diversion, and two others, Alabama and Georgia, will vote on similar proposals next year.

The practice called dispersion is more subtle. This type of misuse of road tax funds occurs when the road revenue is scattered over little-used roads while the principal traffic-bearing highways suffer.

Dispersion is insidious and all too often politically inspired. Local roads and streets, whether urban or rural, benefit all who live on them, use them, or are served by them. Thus the cost of local roads and streets should be borne by all beneficiaries, whether the beneficiaries be motorists or not. Although relieving local property taxpayers is a worthy objective, to accomplish it by over-taxing motor vehicle owners is sheer injustice.

Look at a few facts: In the past four years only 26 cents out of every tax dollar collected from American highway users has been spent for state highways. More and more highway tax revenue is being turned over to counties and municipalities instead of being concentrated on the heavily-traveled through routes.

Conversely, local governments have sharply reduced their payments for their own roads and streets. Highway users now pay about 72 percent of the taxes collected for all roads and streets, even though the general public benefits substantially from local road and street improvements. The situation brought this recent comment from the governor of Michigan:

"The citizen who does not own or drive a car becomes a highway user every time a truck delivers coal or oil for his furnace, every time a doctor drives to his door, every time a bus transports him to work or his children to school. . . . Those who use the roads should pay for them, yes, but everybody uses and benefits from the roads."

Why must the automobile owner, the principal customer of the oil industry, be charged with paying almost the entire cost of local roads and streets that benefit the whole public?

Continued dispersion of road tax revenue on local roads can bring about the breakdown of the principal highway system of a state, and eventually bring the chaos that always follows unjust patchwork taxation.

Diversion and dispersion of gasoline tax funds are symptomatic of governmental spending policies which lead to ever-rising tax burdens on the American people. And since the oil industry today contributes such a substantial part of the total tax bill, oil men cannot afford to view the problem with unconcern.

Although accounting for only three percent of the nation's income, the oil industry, together with its customers, generates seven percent of the tax revenue levied by all units of government. At the latest count, there are 46 federal taxes, 140 state taxes and 40 varieties of local taxes paid directly by the industry and its customers.

The nation's 180,000 separate taxing agencies every four years snatch more than the $12,000,000,000 net investment the industry has made in America's future. On an employee basis, the industry pays an average of $2,000 taxes a year for each worker, about $40 in taxes per week per employee.

The complexity of the industry's tax burden has reached fantastic proportions. Many

(Please turn to page 132)

* Director of American Petroleum Industries Committee.

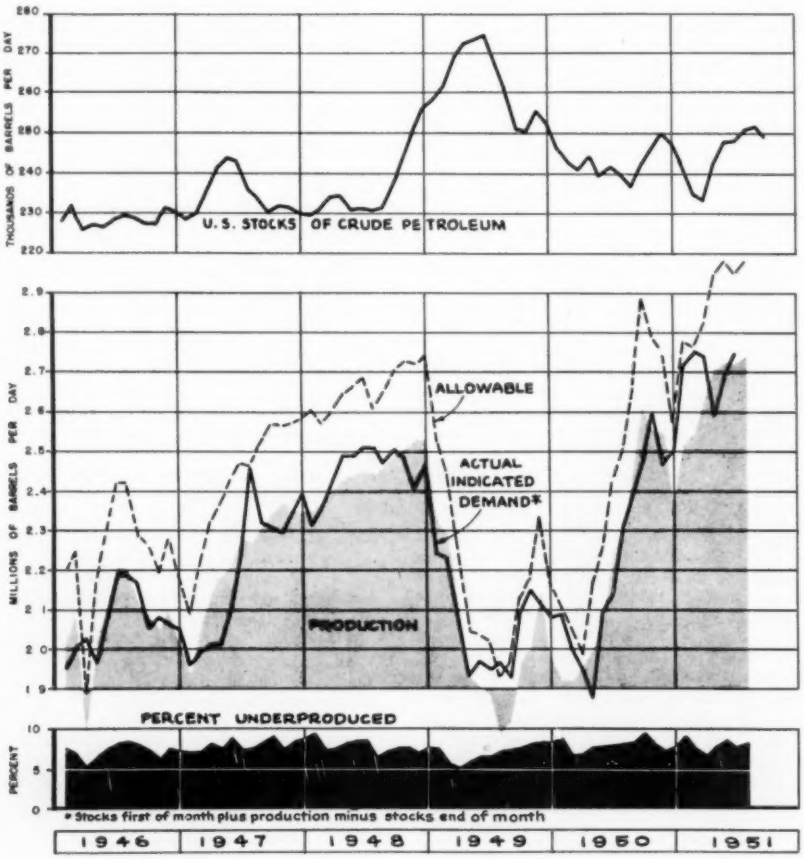
Twenty Years of Texas Conservation

A report of oil progress through the exercise of the police powers of the State of Texas in order to prevent physical waste in the production of oil and gas.

By Lt. Gen. Ernest O. Thompson*

In recognition of General Thompson's outstanding services to Texas and to the nation in promoting the conservation of oil and gas, he is to be presented with the 1951 API gold medal for distinguished achievement at the 31st annual meeting of the Institute in Chicago. He will be the sixth recipient of this outstanding industrial citation. Last year the medal was presented to Walter C. Teagle. Others who have received it are Henry Ford, Dr. Charles F. Kettering and J. Howard Pew.

General Thompson has been a leader in oil conservation since the early days of the East Texas field when, as a new member of the Railroad Commission, he issued an order shutting down the field as a whole until control methods could be worked out. Except for his time out for national service in World War II, General Thompson has devoted his energies to conservation for nearly a quarter of a century.



TEXAS is closely approaching three million barrels per day in crude oil production. She has long since passed this figure when butane, propane, naturals, distillates and condensates are considered. They, too, are liquid hydrocarbons, and are the result of conservation practices, rules and regulations prescribed by the Texas Railroad Commission touching on oil and gas production.

The regular actual prorated oil production for July, 1951, was at the rate of 2,744,750 barrels per day. Adding 339,001 barrels of other liquid hydrocarbons gives a total of 3,083,751 barrels per day.

World oil production in May, 1951, was just below 12 million barrels per day. Of this amount the United States produced 6,167,000 barrels per day. The State of Texas produced 50 percent, or exactly one-half of the oil of the nation and one-fourth of the total daily world production.

Twenty years ago Texas was producing 750,000 barrels of oil per day. We point with pride, naturally, to this record of oil and gas development in a state that has been producing oil for more than a half century. We are, in fact, celebrating in Texas the 50th anniversary of the discovery of Spindletop.

October 5, 1951 was also the 21st birthday of the East Texas oil field. It was the advent of this great field in 1930 that really brought about our later advance in production-control techniques. The wide-open flow from the prolific sands in that vast field very shortly demoralized the oil market, and steps had to be taken to bring order out of chaos.

The Legislature of Texas passed the Market Demand Statute which simply says that production of oil in excess of market demand is

* Member of Texas Railroad Commission

waste and is prohibited. The law says the Texas Railroad Commission shall ascertain the daily market demand for Texas petroleum, and shall set the allowable production figures by order after notice and hearing so as to achieve this waste-prevention result.

The accompanying chart shows how this result has been obtained. The top line shows total United States stocks of crude petroleum. This is, of course, the key figure in guiding production. We try to see that there is always an ample supply on hand. Buyer resistance will always show when stocks are too high.

We know, too, that oil wells never can produce exactly on schedule as allowed. There are always unavoidable shut-downs due to unforeseen factors such as shifts in manpower or mechanical failure. Therefore, we know from long experience that our actual production will be from seven to eight percent under the allowable. If three million barrels per day actual oil is required from Texas wells, we accordingly set the allowable eight percent higher so as not to fall short, then we ascertain the true demand to test our work. This is reflected in the upward or downward movement of crude stocks from Texas origins.

This chart shows that our production of oil never has been less than actual demand, except when stocks on hand were unduly high and were more than ample to fill the difference in oil between current production and true demand.

We have 130,000 producing oil wells, and they average about 22 barrels per well per day. Thousands of Texas wells could produce, if allowed, up to 30,000 barrels of oil per day. But we have found that if the wells are not allowed to produce at too great a rate of flow, the reservoir energy is conserved, and more oil will ultimately be recovered than at higher rates. This is the aim of our conservation efforts. It is our purpose to conserve the reservoir energy so that the most oil can be brought to the well bore and lifted to the surface for man's use. We learned these things in East Texas. That is a great field, but more is behind the results obtained than merely great productivity.

The early estimates on total ultimate recovery for East Texas were around one billion barrels. During the past 21 years we have recovered 2.842 billion barrels, and we expect to recover 2.4 billion barrels in the future, making a total of over five billion barrels where only one billion barrels were expected. Certainly I have heard of no one who early expected in excess of two billion barrels. That estimate we have exceeded by 800 million, and the field easily produces 270,000 barrels per day without loss of reservoir pressure.

We produce this field 19 days a month, and the water produced with the oil is returned to the reservoir on the side of water intrusion. We are thus carrying on a water-flood coincidentally with the primary producing operation. I might say right here that secondary oil recovery should begin with discovery of a field, or just as soon as the pressure indicates an alarming drop.

In East Texas we produced the last billion barrels with no drop in pressure. The bottom-hole pressure today stands at better than 1,000 psi. The Railroad Commission of Texas lets pressure be the guide. If pressures drop, the allowable is reduced promptly.

TABLE I

AVERAGE CALENDAR DAY ALLOWABLE AS OF SEPTEMBER 15, 1951

District	(1) Wells	(2) Schedule Daily Allow	(3) Daily Exempt Allow	(4) Schedule Daily Allowable Subject to Shut-down Days	(5) Column #4 Converted to Calendar Day Basis	(6) Total Average Calendar Day Allowable Col. 3—Col. 5
1	3,906	41,820	25,614	16,206	12,965	38,579
2	4,556	219,034	13,233	205,801	164,641	177,874
3	10,434	616,542	161,543	454,999	363,999	525,542
4	10,776	340,805	62,572	278,233	222,306	284,878
5	2,161	74,765	10,089	64,676	51,741	61,830
6*	3,320	151,944	20,789	131,155	104,924	125,713
6**	21,793	434,545	15,644	418,901	265,304	280,948
7-B	9,258	126,414	42,802	83,612	66,890	109,692
7-C	3,181	147,863	28,504	119,359	95,487	123,991
8	29,912	1,313,431	114,952	1,198,479	957,324	1,072,276
9	23,073	232,055	96,990	135,065	108,052	205,042
10	7,913	103,668	103,356	312	250	103,606
Total	130,283	3,802,886	696,088	3,106,798	2,413,883	3,109,971

6* Denotes all of District #6 except the East Texas Field

6** Denotes the East Texas Field

Total Number of Fields 2,551

Total Number of Fields Exempt 340

TABLE II

PRODUCTION OF TEXAS HYDROCARBONS LIQUIDS—JULY, 1951

(Exclusive of regular prorated crude oil produced)

District	Condensate and Non-Prorated Crude GO-1	Plants	Total	Natural Gasoline	Butane Propane	Other Products	Total
1	6,327	249	6,576	14,566	8,913	0	30,055
2	89,856	84,004	173,860	257,504	123,815	16,901	572,080
3	646,668	127,265	773,933	811,176	576,542	31,685	2,193,336
4	123,999	77,970	201,969	633,428	310,874	92,762	1,239,033
5 & 6 & Car.	97,784	197,144	294,928	1,032,639	766,475	49,201	2,143,243
7-B	3,042	66	3,108	129,269	77,968	0	210,345
7-C	182,321	1,872	184,193	62,029	132,872	1,240	380,334
8	10,462	5,165	15,627	1,173,286	683,199	15	1,872,107
9	3,532	1,160	4,692	185,069	114,034	0	303,795
10	136	585	721	1,263,414	300,563	0	1,564,698
Total	1,164,127	495,480	1,659,607	5,562,360	3,095,255	191,804	10,509,026

Daily Average 339,001

Percent of Increase Over July 1950 .... 12.46

So nicely is the field balanced that the adding of a single day to the production has resulted in a three-pound drop. Then, taking a day off, the pressure will increase a pound.

We feel we have learned how to control production in East Texas, and we have applied what we learned there to the more than 1,000 fields brought in since Etex. East Texas gave us the opportunity and the demand for results. Out of the chaos and confusion of over-production came the application of sound engineering principles which have paid off in extra billions of barrels of oil for man's use.

East Texas, from October 5, 1930 through September, 1951, has furnished 21 percent of Texas oil and nine percent of United States production. Today Texas produces three million barrels of oil per day, of which 270,000 barrels come from this 21-year-old field. There is no substitute for experience. Our trials in Etex have paid off there and elsewhere.

One might well ask, "How has Texas moved up from 750,000 barrels of oil per day to three million barrels per day in these 20 years?" My answer must be that the wise 27½ percent depletion recognition by our Congress has furnished the incentive to drill. It's the drill that finds the oil. Even though only one out of nine wildcats find oil, there must be incentive to drill these exploratory wells.

We give a liberal new-discovery allowable for the first five wells in a new field. This helps. But it's the 27½ percent depletion recognition that drives the bit ever deeper to find oil for peace or war.

Once a field has been discovered, our engineering and administrative effort starts forthwith. With the fifth well completion we call a hearing to ascertain under oath all of the producing characteristics, and then inaugurate the spacing proper for such a field. Orderly development then follows, with constant check on reservoir performance. There are no exceptions to this procedure.

Our orders stopping the wasteful flaring of gas produced with the oil were fought in court, but were fully sustained. They are saving for use two billion cubic feet of gas each day.

The operators, both small and large, have come to understand the science. Applied science and constant vigilance are the watchwords in Texas oil and gas production control. Guesswork has been eliminated. We hope and expect to continue for a long time to help supply the needed oil for a free world.

Billboard posters supplied by the Oil Industry Information Committee for the use of individual oil companies during Oil Progress Week.

Carrying the Facts to the Public

ACTIVITIES of the Oil Industry Information Committee in 1951 again provide impressive evidence concerning the efficacy of the oil industry's public relations program in the United States. True, organization and development are still going on, but the program itself is now entrenched so solidly from coast to coast that basic organization is soundly established. The program, with its 3,700 committees and 18,000 volunteer workers, is functioning smoothly and coherently.

The industry's observance of Oil Progress Week last month was a perfect illustration of the success of the program and the giant strides made over the past year. Thousands of men and women participated in the 1951 operation, the greatest to date. Audiences during Oil Progress Week ranged from comparative handfuls in some places, to hundreds in others and to as many as 4,000 in Detroit, where L. T. White, business research director of Cities Service Co., made the principal address.

The industry's top echelon took the stump as never before. Among prominent leaders who made speeches during Oil Progress Week were T. S. Petersen, president of Standard Oil Co. of Calif.; H. S. M. Burns, president of Shell Oil Co.; P. C. Spencer, president of Sinclair Oil Co.; Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. (Ind.); L. S. Wescoat, president of The Pure Oil Co.; Frank M. Porter, president of the American Petroleum Institute; K. S. Adams, chairman of the board of Phillips Petroleum Corp.; Mil-

The OIIC animated motion picture in technicolor, "Man on the Land," traces the story of man's struggle through the ages for power which he may employ to produce ample quantities of food, clothing and shelter and still retain leisure time for recreation. The film uses the ballad to trace the history of power. A comic foil for the progressive man is the doubter who appears throughout the film to scoff and predict that it can't be done.

lard K. Neptune, president of Platte Pipe Line Co.; Sidney A. Swensrud, president of Gulf Oil Corp.; R. L. Minckler, president of General Petroleum Corp.; Walter Hallanan, president of Plymouth Oil Co. and chairman of the National Petroleum Council; and R. E. Elliott, president of International House, New Orleans, and president of New Orleans Petroleum Corp.

Still others who participated in this great concentration of speeches were B. I. Graves, vice president of Tidewater Associated Oil Co.; Mrs. Marie Drake Carver, granddaughter of Col. Edwin L. Drake, the man who brought in the first commercial oil well in the United States in 1859; H. B. Miller, executive director of the Oil Industry Information Committee; John L. Dupree, national chairman of the Oil Industry Information Committee; Major George Fielding Elliott, nationally known commentator; W. J. Arnold, assistant vice president of The Pure Oil Co.; A. P. Frame, deputy administrator of the Petroleum Administration for Defense; Dr. Gustave Egloff, director of research of Universal Oil Products Co.; P. E. Lakin, executive vice president of Shell Oil Co.; Frank Morgan, vice president of Richfield Oil Corp.; A. L. Nickerson, director of domestic marketing, Socony-Vacuum Oil Co.; and R. J. Diwoky, executive vice president of Pan-Am Southern Corp.

There were, in actuality, so many speeches and meetings scheduled for Oil Progress Week this year, that it will take weeks before an accurate count can be completed. The results undoubtedly will be astounding, for this grass roots program has really taken hold at the community level.

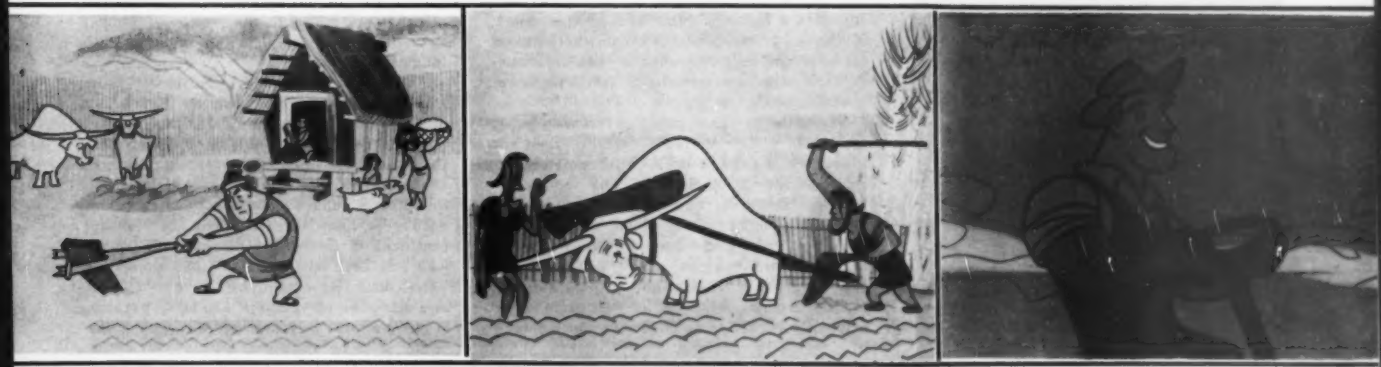
There were special events by the score. They ranged all the way from parades (there was a mammoth one in New Orleans), an eight-block long stationary exhibit of petroleum equipment in Houston, a big "Cavalcade of Petroleum Progress" in Rhode Island, a race between, and an exhibit of, antique automobiles in Missouri, to the selection of Petroleum Beauty Queens in the Rocky Mountain area, a clothing-for-Korea drive in Stockton, Calif., and a mass visit to a blood bank in Watertown, N. Y. Ethyl Corp. engineers, under the sponsorship of the Oil Industry Information Committee, repeated a road test demonstration to prove that two gallons of 1951 gasoline will do the work required by three gallons of 1925 vintage. This was staged on a section of the New Jersey Turnpike not yet opened to the public.

One of the most unusual and ambitious special event projects was carried out in Utah. There 54 seniors, one from each of the state's school districts, were guests of the OIIC. They visited oil fields and refineries, participated in Oil Progress Week events, then returned to their schools to make oral reports to the student bodies. The climax of the project was an essay contest revolving around the petroleum industry—the prize a scholarship at the University of Utah.

Admittedly, Oil Progress Week is the Oil Industry Information Committee's "showcase" affair, but it has met with such resounding success in all parts of the country that it is a project of which the Committee and the industry can be extremely proud. The impact on the public with consequent advances in the understanding of oil and its intricate operations unquestionably will bear fruit for a long time to come.

The Committee produced another motion picture in 1951. This one is titled "Man on the Land," and represents a sharp departure from its two predecessors, "The Last Ten Feet," and "24 Hours of Progress." In full Technicolor, it uses animation rather than live characters with a ballad singer carrying the message of free enterprise. It tells the story of agriculture from the earliest days on down to the contemporary period, where oil-powered machinery, plus fertilizers, insecticides and a host of other petroleum products, help American farmers produce the greatest abundance of crops in history. Interwoven strongly is the theme that only during those phases of history when free men are able to build and develop is progress made. Emphasizing the extra pains to which the Committee went for its current motion picture is the fact that it was produced by United Productions of America, an Academy Award winner in 1950.

"Man on the Land" was released for television and general showing at the beginning of Oil Progress Week. Since it was designed for all types of audiences, it is expected to



receive countless showings all over the country. So successful have been the Committee's motion pictures that prints have been shipped to many other countries. In fact, one man in Bombay, India, bought prints of the first motion pictures, then placed an order for the 1951 production sight unseen and long before the picture itself was even finished.

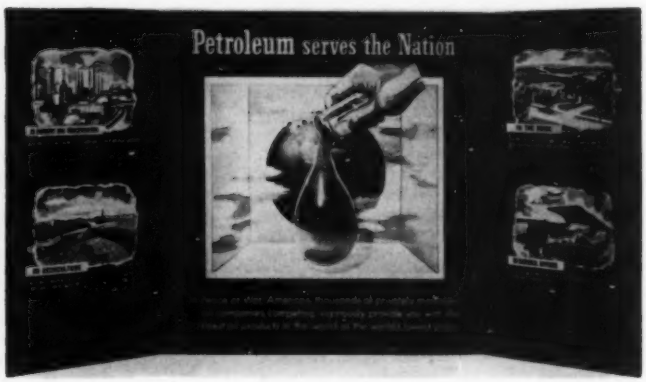
To bring home the story of oil at war, the Committee engaged noted photographer Horace Bristol for a special assignment in Korea, to get action pictures of oil's participation at the front. From the several hundred shots that he made, the Committee selected 60 which are now being made available to many industry and non-industry publications.

One of the biggest projects handled by the Committee during 1951 was a special "Supply and Demand Report." This was designed to give editors, legislators and all persons interested in the industry the best possible picture of its current position, the job it is now doing and the task it faces in keeping supplies ahead of the tremendous increases in demand.

The report was given personally, where possible, to every newspaper editor in the country, as well as to radio stations, columnists, and commentators. Presentations were made by local oil men and by field representatives of the Oil Industry Information Committee. In some cases they were made at group luncheons of oil men and editors. Among cities which held luncheons were Boston, Grand Rapids, Chicago, Detroit and Indianapolis.

The project was not designed for publicity purposes, and oil men stressed this fact. Nevertheless, many editors saw news value in the facts which comprised the report, and wrote stories about the oil business for their publications. They were glad to receive the industry's self-appraisal, and many expressed hope that similar reports would be made available in the future.

John M. Lovejoy of Seaboard Oil Company, chairman of the public relations committee of the API board of directors.



Window display prepared by OIIC for use during the 1951 observance of Oil Progress Week.

John L. Dupree, of Ivy Lee and T. J. Ross, has been a member of the OIIC committee since its organization as a representative of Socony-Vacuum Oil Co. He has been chairman during the past year.

The Committee, at its regular September meeting, agreed the plan had substantial merit and decided to bring up to date the "supply and demand" report at least once a year, and more often if conditions and statistics warrant. In addition to the understanding of the industry generated by the report, it also led to many personal contacts between oil men and editors, contacts that are beneficial to both in developing accurate press reports on oil's operations.

Statistically, the program made great strides in 1951. A report covering the first nine months showed the local committees increased from 3,500 to 3,700, and that membership jumped from 14,000 to 18,000. The number of committee meetings, speeches, film showings, radio and television shows all were higher than for a comparable period of the preceding year. Interest and enthusiasm, key factors in any public relations program, were extremely high during 1951 and the upsweep is expected to continue.

Institutional advertising on behalf of the industry in the current year made a record. With its biggest budget in history, OIIC advertising in 1951 used a news picture approach, similar to the style of Life magazine. Advertising managers of a number of oil companies aided the subcommittee in preparing copy. The average rating by the Gallup-Robinson method showed that OIIC ads were considerably above the institutional average. Starch ratings were about five times the average for all advertisements. The campaign itself was kept fluid enough so that, when tests indicated certain objectives were not being emphasized satisfactorily, steps were taken immediately to improve headlines, illustrations and copy.

Local newspaper advertising, stimulated by the observance of Oil Progress Week, is expected to far exceed the four million lines reported as used during the same 1950 period.

The school program was expanded substantially in 1951. Forty-eight new counties were added to the pilot program, making a total of 72 counties at the beginning of the 1951-52 school year. It has been estimated that more than 13,000 teachers and 200,000 students will participate in the program during the current term. A variety of new materials, including such booklets as "The Physics of Petroleum," and "The Chemistry of Petroleum," as well as film strips and other informational pieces, were added to the wealth of publications prepared especially for this phase of the industry's program.

At its regular meeting in November, which is held in conjunction with the 31st Annual Meeting of the American Petroleum Institute in Chicago, the Oil Industry Information Committee will finalize its operating plans for 1952. A new OIIC chairman will be elected to succeed John J. Dupree, who represents Socony-Vacuum Oil Co. John M. Lovejoy, president of Seaboard Oil Co. of Delaware, who has been chairman of the public relations committee of the API Board of Directors since the inception of the OIIC program, is stepping out in November also, and a successor is to be appointed later.

Recent Developments Show Flexibility Of International Oil Industry

THE remarkable flexibility of the petroleum industry has again been demonstrated in the past three months since Iranian supplies disappeared from the world markets. In the first half of the year Persia furnished nearly seven percent of the world's crude oil and about five percent of the supply of refined products. In the third quarter, no crude or products has been shipped from that nation, yet the industry has found it possible to meet the requirements of its customers with few exceptions.

Uneconomic movement of crude and refined oil has been necessary to supply markets in the immediate trade territory formerly served by the huge Abadan refinery, but the oil companies have not shrunk from the task of organizing for the emergency or from paying the excess costs involved. Products from Caribbean and United States refineries have been shipped half way around the world to care for the needs of Africa, India and the orient. Only in the case of aviation gasoline has there been real consumer hardship. The shortage of avgas for planes operating from Europe to the Middle and Far East has curtailed commercial aviation activities to a substantial degree.

Easiest job of the industry was to supply enough crude. Most difficult was to replace the 18,000 b/d of avgas formerly refined at Abadan. Kerosine and heavy fuel supplies were made tighter, but nobody was seriously inconvenienced by the loss of motor fuel from Persia.

As this is written, crude supplies are easy and there are even suggestions that curtailment of output in some areas might be desirable. World output of crude in the third quarter is estimated at 11,705,000 b/d as compared with 11,692,400 b/d in the first half year and 10,428,200 b/d in 1950. Adding the current output of natural gas liquids, the world's supply of hydrocarbons from petroleum is about 12,300,000 b/d.

An accompanying table shows crude production of various nations and areas for the third quarter compared with earlier periods. The tabulation gives emphasis to the earlier estimates of the producing capabilities of oil fields in the Middle East. Combined production of Kuwait and Saudi Arabia in the third quarter was 1,514,500 b/d, compared with 996,800 b/d in the first quarter of the year. The increase of 517,700 b/d in a six-month period is astonishing. The United States also has made an outstanding record by turning out 763,000 b/d more oil in the third quarter than the average for 1950. Venezuelan output is up 213,000 b/d over last year. With the notable exception of Canada, increases in crude production have been moderate elsewhere throughout the world.

Comparing this production volume with estimate of world demand for the year shows the supply to be a little on the plus side. Current estimates are that demand for the year will approximate 12,130,000 b/d.

More important than the industry problem created by the fact that products are being manufactured too far from market, is that caused by an imbalance in supply and demand for individual products. There is, as previously suggested, an oversupply of automobile gasoline and too little avgas. Also there is not enough of either kerosine or heavy fuel oil. The closing down of Abadan is responsible for much of this imbalance. The great Anglo-Iranian plant was a heavy producer of avgas. Persian crude is rich in kerosine and heavy fuel, so that the Abadan shut-down was more important than the size of the plant would suggest.

In the early stages of the nationalization controversy in Persia, the oil industry assumed that a settlement would be reached between the Iranian government and AIOC. There was some increase in crude output and refinery runs, but not much. It was only when the shut-down became a fact that cooperative groups in Britain and the United States took emergency measures to meet the situation. The immediate problem having been solved, it now becomes necessary for the industry to consider future possibilities for both the short term and for a more extended period.

Assuming that the controversy is not settled within the next few months, it is conceded that there may be some difficulty in supplying adequate quantities of kerosine in Asia and Oceania during the first half of 1952, and residual fuel oil may be short in several areas. Recent purchases of refined products in the United States have taken care of the final quarter fairly well, but there is some question as to whether there will be enough surplus products to keep up the present rate of exports in the coming year.

The United States Bureau of Mines recently has revised its forecast of demand for the final quarter of 1951 and the first quarter of next year. Revised forecasts tend to indicate a smaller domestic demand than had been anticipated earlier. In the first quarter of 1951, domestic demand for all oils in the United States was 14.3 percent above the same quarter in 1950; in the second quarter the increase was 9.7 percent; in the third quarter only 5.7 percent; while the final quarter is estimated at 7.6 percent over 1950. Demand for the year as a whole is placed at 7,101,000 b/d, an increase of 9.3 percent. Earlier it was estimated that domestic demand would average 7,178,000 b/d this year. The new estimate thus is 28 million barrels lower than previously calculated. This is somewhat less than the total of recent purchases in the United States by the British buying agency, Asiatic Petroleum Co., for liftings through December.

For the first quarter of 1952 the Bureau of Mines estimates total United States oil demand at 8,140,000 b/d, up 5.2 percent over the first quarter in 1951. This estimate is based on continuation of the present abnormal rate of exports of refined products which are roughly double those experienced in early months of the present year. It suggests that U. S. domestic demand will be up less than four percent in the quarter.

In a recent letter to the Louisiana Department of Conservation, Bruce K. Brown, deputy petroleum administrator, gave an analysis of the first quarter situation in the United States on the assumption that Abadan still would be shut down in the early months of 1952. Mr. Brown believes that United States refineries will be required to operate at capacity levels during the quarter to meet domestic requirements, and that any overseas shipments will have to come from storage. He believes that shipments from this source should not exceed 100,000 b/d in the January-March period.

Some months ago it was thought that the United States would have to supply 270,000 b/d of refined products and permit the diversion of 190,000 b/d of foreign crude to meet the shortages created by the Persian shutdown. Experience in the earlier months of the period have indicated that total demand for crude and products up to the end of the year will be 180,000 b/d lower than previously estimated. It now is estimated that United States refineries will be required to export 190,000 b/d of products and permit diversion of 90,000 b/d of crude.

Factors involved in the changed picture as outlined by Mr. Brown include the recent increases in Kuwait and Saudi Arabian crude production, increases in crude runs at foreign refineries and a reduction of 75,000 b/d in foreign demand for products. The reduc-

WORLD CRUDE OIL PRODUCTION

(Thousands of Barrels Daily)

North America	Year 1950	First Quarter 1951	Second Quarter 1951	Third Quarter 1951
United States	5,402.0	5,964.0	6,142.5	6,165.0
Canada	78.3	90.6	127.4	160.6
Mexico	202.0	210.0	200.0	205.0
Total North America	5,682.3	6,264.6	6,469.9	6,530.6

South America & Caribbean	Year 1950	First Quarter 1951	Second Quarter 1951	Third Quarter 1951
Venezuela	1,498.0	1,650.0	1,700.0	1,711.0
Colombia	93.1	105.8	107.5	107.0
Argentina	65.9	69.0	72.0	70.0
Trinidad	56.5	56.6	56.6	56.6
Peru	41.2	42.6	43.0	42.5
Ecuador	7.4	7.5	7.5	7.5
Bolivia	1.7	1.4	1.2	1.2
Cuba	0.3	0.3	0.3	0.3
Brazil	0.8	1.3	1.3	2.5
Chile	1.6	1.7	1.7	1.7
Total South America	1.766.5	1,936.2	1,991.1	2,000.3
Total Western Hemisphere	7,448.8	8,200.8	8,461.0	8,530.9

Europe	Year 1950	First Quarter 1951	Second Quarter 1951	Third Quarter 1951
Romania	89.0	89.0	89.0	89.0
Austria	28.4	40.0	40.0	42.0
Germany	21.6	23.8	26.0	28.0
Netherlands	13.6	13.6	14.1	14.1
Hungary	11.5	11.5	11.5	11.5
Yugoslavia	7.6	8.2	8.2	8.2
Poland	3.3	3.3	3.3	3.3
Albania	7.7	7.8	7.8	7.8
France	2.4	4.4	4.9	5.5
United Kingdom	0.9	0.9	0.9	0.9
Czechoslovakia	0.8	0.8	0.8	0.8
French Morocco	0.8	1.2	1.2	1.2
Italy	0.2	0.2	0.2	0.2
Europe Ex. USSR	187.8	204.7	207.9	212.5
USSR*	750.0	800.0	810.0	825.0
Total Europe	937.8	1,004.7	1,017.9	1,037.5

*Includes Sakhalin

Near and Middle East	Year 1950	First Quarter 1951	Second Quarter 1951	Third Quarter 1951
Iran	665.5	683.5	641.0	39.0
Saudi Arabia	546.7	610.5	737.3	834.5
Kuwait	345.0	386.3	507.3	680.0
Iraq	136.2	169.4	173.0	177.0
Egypt	45.3	43.9	44.6	44.0
Bahrein	30.0	30.0	30.0	30.0
Turkey	0.8	0.8	0.8	0.8
Qatar	33.7	46.7	49.0	49.0
Total Near and Middle East	1,803.2	1,971.1	2,183.0	1,854.3

Far East & Oceania	Year 1950	First Quarter 1951	Second Quarter 1951	Third Quarter 1951
Indonesia	130.7	149.5	148.6	150.0
British Borneo	84.8	102.0	104.0	110.0
New Guinea	4.8	4.8	4.8	4.9
India	5.3	5.5	5.2	5.2
Japan	5.7	6.1	7.3	7.5
China	2.0	2.0	2.0	2.0
Pakistan	3.5	3.4	3.7	3.7
Burma	1.6	2.0	2.0	2.0
Total Far East & Oceania	238.4	275.3	277.6	285.3
Total Eastern Hemisphere	2,979.4	3,251.1	3,478.5	3,177.1
WORLD TOTAL	10,428.2	11,451.9	11,939.5	11,708.0

The conflict in Korea is creating a demand for large quantities of petroleum products for use on land and in the air. The photograph above shows containers being filled with a mixture of napalm powder and gasoline to produce fire bombs. Below, a new contingent of army replacements is lined up before a depot containing thousands of drums of gasoline and oil. Photographs are by Horace Bristol for the Oil Industry Information Committee of the American Petroleum Institute.

tion in demand is based on a reduction in stocks or a postponement of normal seasonal inventory accumulations, some restrictions of supplies to customers, avoiding expansion of marketing outlets and a reduction in earlier estimates of demand.

Mr. Brown broke down probable export requirements from the United States for the September-December period as follows:

Product	Barrels Daily
Gasoline	46,000
Kerosine	37,000
Distillate	60,000
Residual	47,000
Total	190,000

He estimated year end stocks at domestic refineries as follows:

Product	Barrels
Gasoline	123,000,000
Kerosine	24,000,000
Distillate	84,000,000
Residual	48,000,000
Crude	243,000,000

Some students of the industry have said recently that the Iranian situation has prevented stocks of finished products in the United States from increasing at an uncomfortable rate in the third quarter. Even in the face of the British buying, refined oil inventories increased more than 51 million barrels in the six months ended Sept. 30. In that period exports of refined oils were 29 million barrels higher than the rate experienced in the first quarter. Without the emergency purchases for overseas shipments it thus appears likely that domestic inventories of refined products would have risen some 80 million barrels in the six months.

Without a crisis in Persia the rate of expansion in crude oil production in Saudi Arabia, Kuwait, Venezuela and the United States would have been impossible. Even with Iranian crude missing, the supply of raw materials now is easy on a world basis. Allowables in Texas, for example, have been reduced by 90,000 b/d.

On a longer term basis the oil industry now is able to contemplate the loss of the Abadan refinery with equanimity. It is pointed out that world refinery capacity is being expanded at a rate which would replace Abadan in about six months, if growth in demand is ignored. Current expansion is about 60-70,000 barrels of daily capacity each month. Within recent weeks, for example, the 130,000 barrel Esso refinery at Fawley, England, was dedicated. Shell and Anglo-Iranian have both increased their capacity and further construction will be completed in the first half of 1952. Once the first half of next year has passed, some economists believe that there will be no difficulty in meeting world requirements without Abadan.

In the case of crude oil, there is even less to cause worry for the long pull. The Iraq Petroleum Company's big-inch line to the Mediterranean is ahead of schedule. By April of next year it will be capable of delivering an additional 315,000 barrels of crude each day to the world's markets.

There has been some discussion in daily papers in the United States recently of the possibility that the Iranian government might work out a deal with the Soviet government under which the latter would operate Abadan

and the Persian oil fields. It has been suggested that Russia could buy enough tankers in world markets to carry a substantial volume of oil to its own ports and to other nations with which it could do business.

From the viewpoint of the western world such deal would be viewed with great apprehension in the present delicate condition of international relations. It would take the strain off the Russian oil industry which has found it necessary to require its satellites to ship large quantities of oil to the USSR which they needed in their own domestic economy. It is presumed, also, that the USSR could then enter world markets, at least to some extent, to compete with British, American, Dutch and French oil companies.

Assuming that the Iranian impasse is broken at the United Nations conferences so that Persian oil in some volume can re-enter international trade, there will be a comfortable margin of refinery capacity available. This would improve the flexibility of the industry by permitting yields to be adjusted more readily to demand. Most profound effect would be on world crude markets.

Whatever happens in Iran, more Iraq oil is coming on the market next spring with the opening of the new large diameter pipe line. With Iran again producing, though probably not at its full former rate, and with Iraq's output up about 300,000 b/d, it is obvious that some cutbacks might become necessary in high cost areas. Crude from Iran, if it could not be processed at Abadan, would fall into the high cost bracket because of the long sea voyage to Europe. Saudi Arabian and Iraq crudes would be in a favorable position to compete for European business because of their pipe line advantage.

Within the past few years a much greater degree of balance has been reached between crude production and product consumption in the eastern and western hemispheres. From the early days of the oil era the eastern hemisphere has depended on the west for oil. This year the net shortage in the eastern hemisphere was reduced to about 100,000 b/d in the first six months. This compares with an eastern hemisphere shortage of 244,000 b/d in 1950 and of 691,000 b/d in 1947. Had the Iranian trouble not developed, the eastern hemisphere would have been in balance by 1952.

On a hemispheric basis, refining capacity was about in line with demand before the Abadan shut-down. World demand on a 1951 basis and refining capacities divided by hemispheres were about as follows prior to the suspension of Abadan's operations:

Hemisphere	Refining Capacity Barrels Daily	Demand
Eastern	3,714,056	3,580,000
Western	8,876,010	8,473,000
Total	12,590,066	12,053,000

With the Iranian industry shut down, there is a theoretical balance between supply and demand in the world as a whole, but the eastern hemisphere develops a shortage of about 380,000 b/d of products. On a net basis it becomes theoretically necessary to ship 380,000 barrels of crude daily from the eastern hemisphere to the west for refining, and necessary to carry the products back to eastern hemisphere markets. This underlines the earlier statement in this article that the industry currently is operating in part on an uneconomic basis because of the trouble in Persia.

Two great areas in the eastern hemisphere are shortest of refinery capacity to meet local needs. Europe is about in balance. The Middle East still has surplus local capacity, but Africa, Asia and Oceania are short.

This year's demand in Europe, outside of the USSR and satellite countries, is estimated at 1,400,000 b/d and currently in consuming about 1,300,000 b/d. The Middle East is consuming oil at the rate of about 290,000 b/d and has a present refining capacity outside of Iran of about 425,000 b/d. Of this, 83,000 barrels of capacity in Israel is shut down for want of convenient supplies of crude. Arab nations are unwilling to furnish crude for this plant, so any oil processed must be brought from distant areas.

Africa has a refining capacity of only about 50,000 b/d and currently in consuming about 130,000 b/d of oil. It has depended largely on the Middle East, South America and Europe for refined products. Capacity now is being enlarged but completion is still a couple of years away.

Asia and Oceania are about in the same condition as Africa as far as refining capacity is concerned. Plants in this vast area have a combined capacity of about 313,000 b/d while demand is now 580,000 b/d. The deficit of 267,000 b/d must be made up by shipments over very great distances. Considerable oil for the orient now is moving from the Caribbean to replace that previously supplied from Persia.

While new capacity is being erected in Australia and is being considered in other areas, there is no immediate solution for the needs of Asia and Oceania without very long supply lines unless Abadan goes back on stream.

Whatever may be the outcome of negotiations with Persia for a resumption of operations, it is clear that the world has enough crude oil in sight to meet the demands of an expanding economy, but that construction of refining capacity must be accelerated to provide for growth in demand and, equally important, a cushion to permit of flexibility in case of emergencies.

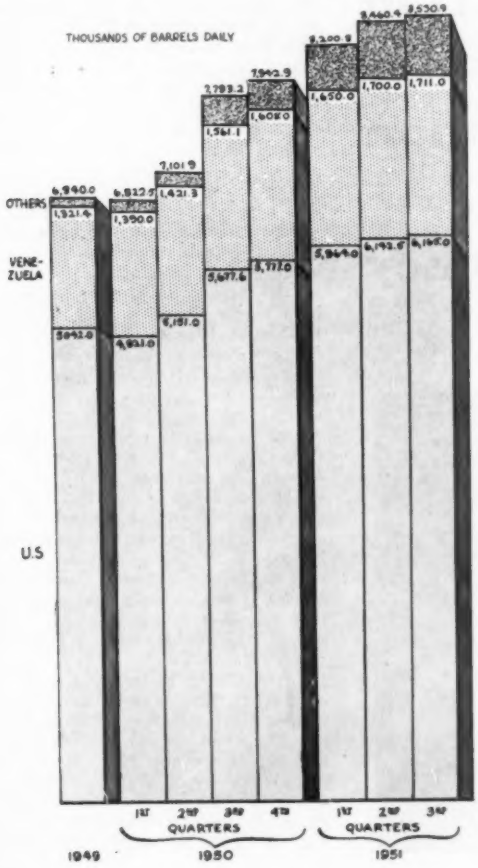
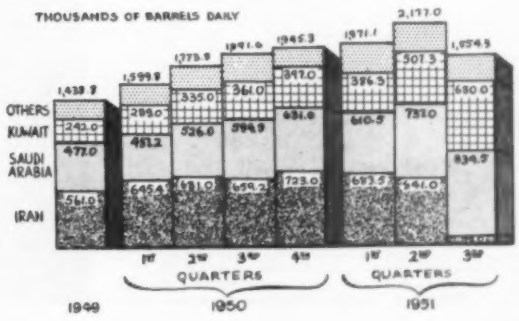


Chart at left shows how western hemisphere production has increased 25 percent since 1949. United States output is 22 percent higher now than in 1949 while Venezuela output is up 30 percent. Figures do not include natural gas liquids. Chart at lower right illustrates how a great deal of the loss in Iranian production already has been made up by increases in Saudi Arabia and Kuwait.



Stewart T. Coleman, chairman, Foreign Petroleum Supply Committee.

Foreign Supply Committee Aids PAD in Oil Distribution Emergency

Augustus C. Long, vice-chairman, Foreign Petroleum Supply Committee. Bachrach photo.

IT IS no accident that refineries throughout the world have had adequate supplies of crude oil in recent months and that consumers generally have not suffered for lack of refined products in the far corners of the earth. Behind the seeming ease with which the industry has adjusted its supply and distribution lines lies a vast amount of careful spade work on the part of oil industry committees in the United States and Britain.

In the United Kingdom, oil companies have set up the Oil Supply Advisory Committee which has advised the British Ministry of Fuel and Power regarding the oil situation in sterling territory and has funneled orders for crude and products to western hemisphere sources through Asiatic Petroleum Co.

In the United States, 19 oil companies with foreign interests have formed the Foreign Petroleum Supply Committee to advise the Petroleum Administration for Defense. This main committee, with a secretariat loaned by the companies and six sub-committees, has set up headquarters at 270 Park Avenue in New York, taking an entire floor of a hotel.

Into these offices flows a steady stream of data regarding the current consumption of petroleum products in every country outside the Russian zone of influence. Here is assembled the inventory position in these areas and anticipated deliveries to replenish stocks as they become depleted. From the assembled data supplied by co-operating companies to various sub-committees, the main committee is able to prepare recommendations for action by the PAD in Washington.

First move to establish the Foreign Petroleum Supply Committee was taken by the PAD when it became apparent that the difficulty in Persia would throw the normal flow of products in international commerce out of kilter, and the 19 companies were approached by PAD relative to the formation of a representative industry group to aid and advise PAD. The result was a voluntary agreement between the companies which was approved by the government on June 25. Desire of the group was to prevent a shortage of military supplies to the European defense organization being built by General Eisenhower and his staff and to keep customers in other friendly nations from suffering for lack of oil products. Even before the Iranian crisis developed, PAD had been planning such a foreign supply organization.

Under United States laws, joint action could not be taken by competing oil companies without approval of the Department of Justice because of the interpretation that has been put on anti-trust laws. Freedom of action such as is made available in time of war was not possible in this situation because the emergency was not created by the Korean war but rather by an international dispute

between Persia and Britain. First step, then, was to obtain a plan of action from the Petroleum Administration and approval by the Department of Justice. This approval was obtained on July 26 and the various committees already formed went into action.

Top group is the main committee, called the Foreign Petroleum Supply Committee, consisting of a representative and an alternate from each of the 19 co-operating companies. Chairman of this group is S. P. Coleman of The Standard Oil Co. (N. J.) with A. C. Long of the Texas Co. as vice chairman. Subcommittees which gather data for the main committee deal with supply and distribution, production, refining, materials, tanker transportation, pipeline transportation and overseas liaison. This latter committee is based in London. The British also have a liaison group in the United States, of which H. Wilkinson of Shell is the observer with the main committee, with various other designations to the subcommittees as required. Members of the other committees are listed in the accompanying tabulation.

Reporting to the main committee is a smaller operating group called the Executive Committee, also headed by S. P. Coleman of The Standard Oil Co. (N. J.) with A. C. Long of The Texas Co. as vice chairman. Other members of the executive committee are: W. F. Moore of Arabian American Oil Co.; W. H. Pinckard of California Texas Oil Co.; Col. J. F. Drake of Gulf Oil Corp.; W. L. Faust of Socony Vacuum Oil Co.; W. B. Letcher of Standard Oil Co. of Calif.; J. C. Sample of Standard Vacuum Oil Co.; and P. C. Spencer of Sinclair Oil Corp. An alternate was named for each member of the committee.

Secretariat for the committees consists of economics experts on loan from various companies. These include Arthur G. May of Standard - Vacuum, executive secretary; C. Marvin Case of Socony as assistant executive secretary and liaison between the main committee and all sub-committees; and Ralph O. Barr of Standard-Vacuum, John Q. Johnson of Creole, Robert J. Hayes of Caltex and William Ebert of the Jersey Standard.

The committee has employed Fowler Hamilton of Cleary, Gottlieb, Friendly and Hamilton as attorney.

The committees are creatures of the Petroleum Administration and operate under the supervision of C. S. Snodgrass, assistant deputy administrator in charge of foreign operations. All meetings are called by the PAD from Washington and agenda for all meetings is set by the Administrator. The committees have not pooled any facilities or allocated markets. They have merely made recommendations that the PAD take action in areas where, for example, crude may be short or avgas unavailable.

All committee actions are reviewed by the committee counsel and company counsel and then transmitted to Washington for possible action by PAD. The PAD handles actions with various government departments such as Defense, State and Justice.

As a result of PAD action, the various oil companies have rerouted tankers and diverted shipments of crude and products to danger areas. This has been done at a considerable loss to the oil companies, because the most economical hauls have been ignored in the emergency. Although the cost has been considerable, the work of the main committee, its subcommittees and working staff has been highly effective in getting the right amount of oil and products delivered to the right place at the right time despite an over-night loss of a substantial volume of the world's refining capacity in a distant area which already was seriously short of manufacturing facilities. Principal difficulty in obtaining relief has been experienced in Asia, where commercial aviation has been hampered and supplies of kerosine and other oils delayed. Products now are arriving at distant areas, however. To minimize the avgas shortage, components have been transferred halfway around the world from East to West Indies at a loss to the companies involved.

FOREIGN PETROLEUM SUPPLY COMMITTEE ORGANIZATION

Main Committee

Co. Represented	Member	Alternate
Aramco	W. F. Moore	J. T. Duce
Atlantic Refining	L. A. Webb	J. D. Kurtz
Caltex	W. H. Pinckard	E. A. Beverly
Creole	R. W. Miller	L. G. Smith
Gulf	Col. J. F. Drake	S. A. Swensrud
Socony-Vacuum	W. L. Faust	C. T. Crawford
Standard of Calif.	B. W. Letcher	T. L. Lenzen
Standard of Jersey	S. P. Coleman	E. E. Soubry
Standard Vacuum	J. C. Sample	C. B. Marchall
Texas Co.	A. C. Long	A. W. Lilley
Tidewater	B. I. Graves	L. W. Parson
Venezuelan Petrol.	E. L. Steiniger	H. M. Russell
Amer. Independent	R. K. Davies	Harley Stephens
Barber	T. Rieber	W. L. Kallman
Coronado	A. A. Curtice	D. H. Dohm
Pacific Western	D. T. Staples	D. F. Krug
Superior	W. M. Keck Jr.	R. E. Johnson
Union Oil	R. C. Taylor	A. C. Stewart
Sinclair	P. C. Spencer	A. E. Watts

Oil Supply Advisory Committee—British Observers

Shell	H. Wilkinson	L. A. Astley-Bell
Anglo-Iranian	W. D. Heath-Eves	J. E. Anderson
Executive Secretary	A. G. May (Standard-Vacuum)	
Asst. Ex. Sec.	C. M. Case (Socony)	

Production Sub-Committee

Company	Member	Alternate
Aramco	D. Nix	D. M. Brown
Atlantic Refining	J. H. Lawson	F. W. Turner
Caltex	F. C. Sealey	C. E. Davis
Creole	A. J. Freie	R. P. Harshberger
Gulf	R. L. Boggs	H. J. Wharton
Socony Vacuum	R. Siegel	H. I. Fry
Standard of Jersey	E. S. Neal	B. C. Refshauge
Standard Vacuum	H. W. McCobb	A. Wright, Jr.
Texas Co.	H. H. Arnold, Jr.	J. P. McCulloch
Venezuelan Petrol.	H. M. Russell	E. L. Steiniger

Oil Supply Advisory Committee—British Observers

Shell	E. W. Clark	A. G. Gregory
Anglo-Iranian	J. E. Andersen	R. G. Brown
Secretary	J. Q. Johnson (Creole)	

Refining Sub-Committee

Company	Member	Alternate
Aramco	R. S. Hatch	S. C. Harper
Caltex	H. B. Nichols	M. H. Lipp
Creole	J. D. Long	J. W. Miller
Gulf	C. W. Hurley, Jr.	C. C. Richmond
Socony Vacuum	F. C. Fahnestock	J. W. McKee
Standard of Jersey	B. Mead	C. E. Lanning
Standard Vacuum	R. B. Carder	J. W. Price
Texas Co.	F. H. Holmes	L. V. Phillips
Venezuelan Petrol.	E. L. Steiniger	H. M. Russell
Barber	W. L. Kallman	C. T. McGrady

Oil Supply Advisory Committee—British Observers

Shell	E. Pfister	A. G. Gregory
Anglo-Iranian	D. G. Hitt	J. H. Dove
Secretary	J. Q. Johnson (Creole)	

Overseas Liaison Sub-Committee (London)

Company	Member
Caltex	F. von Schilling
Gulf	D. S. M. Langworthy
Socony Vacuum	C. Darlington
Standard of Jersey	H. W. Page
Standard Vacuum	A. Elliott

Supply and Distribution Sub-Committee

Company	Member	Alternate
Aramco	R. S. Hatch	L. O. Gray
Atlantic Refining	J. D. Kurtz	J. H. Lawson
Caltex	E. A. Beverly	R. A. Kerr
Creole	F. M. Platts	J. W. Miller
Gulf	E. F. Perkins	R. L. Boggs
Socony Vacuum	C. T. Crawford	L. B. Davis
Standard of Calif.	H. H. Flynn	P. Best
Standard of Jersey	J. A. Cogan	S. D. Turner
Standard Vacuum	E. J. Smith	W. C. Gower
Texas Co.	H. C. Hose	P. L. Harwood
Tidewater	O. Ambrose	A. J. Senee
Venezuelan Petrol.	H. M. Russell	E. L. Steiniger

Oil Supply Advisory Committee—British Observers

Shell	J. H. Kirby	
Anglo-Iranian	W. C. Connel	
Secretary	C. M. Case (Socony)	

Tanker Transportation Sub-Committee

Company	Member	Alternate
Aramco	H. A. Britton	P. P. Nibley
Atlantic Refining	J. W. Forgie	C. E. Frankenfield
Caltex	A. Neilson	W. P. Gaynor
Creole	A. J. Freie	D. L. Lynn
Gulf	R. D. McGranahan	C. F. Vander Clute
Socony Vacuum	P. S. Wise	J. M. Hillcoat
Standard of Calif.	G. Lindley	B. D. Robertson
Standard of Jersey	J. Winterbottom	G. A. Gumbs
Standard Vacuum	J. M. B. Howard	R. E. Howe
Texas Co.	T. E. Buchanan	A. S. Nelson
Venezuelan Petrol.	A. E. Watts	H. M. Russell

Oil Supply Advisory Committee—British Observers

Shell	E. R. Baxter	M. J. Paulli
Anglo-Iranian	W. C. Connel	
Secretary (Acting)	F. O. Carlson (Esso Export)	

Pipeline Transportation Sub-Committee

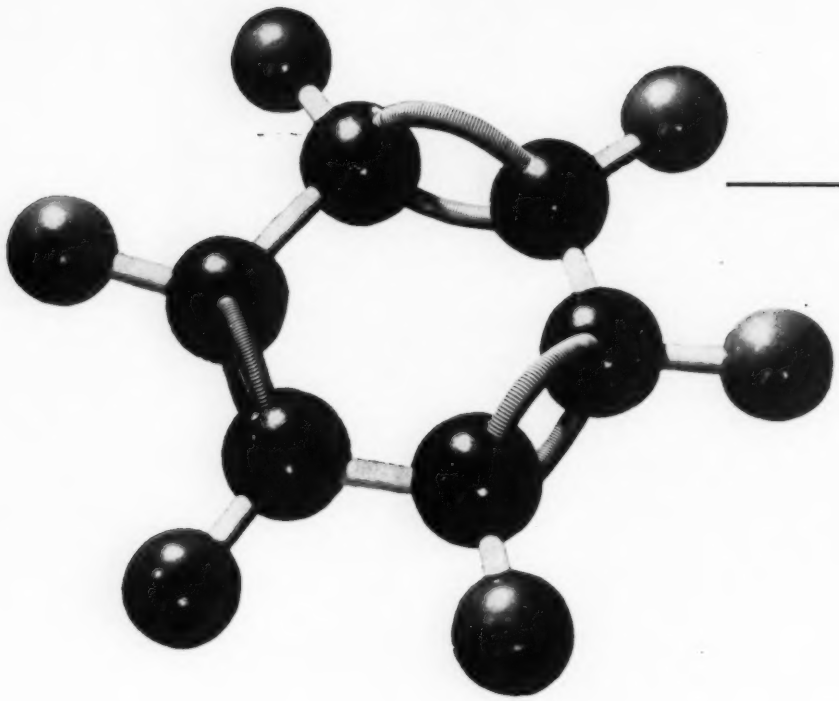
Company	Member	Alternate
Gulf	H. J. Wharton	No alternates
Socony Vacuum	E. D. Seymour	appointed
Standard of Jersey	L. F. Kahle	at this time.
Standard Vacuum	D. E. Davis	
Texas Co.	Oscar Wolf	
Trans-Arabian Pipeline	P. P. Nibley	
Venezuelan Petrol.	H. M. Russell	
Chairman	H. J. Wharton	
Vice Chairman	P. P. Nibley	
Secretary (Acting)	R. O. Barr	

Materials Sub-Committee

Company	Member	Alternate
Aramco	A. H. Chapman	R. L. Dowrick
Atlantic Refining	F. W. Turner	K. D. Wallace
Caltex	D. J. Schnabel	V. J. Minner
Creole	A. J. Freie	J. H. Bowman
Gulf	E. D. Brockett	C. W. Lutz
Socony Vacuum	E. W. Beck	J. T. Kilpatrick
Standard of Calif.	G. Langsdorf	F. C. Boucke
Standard of Jersey	B. A. Warren	W. Gluckert
Standard Vacuum	G. Young	W. S. Lee
Texas Co.	F. G. Schlemmer	G. R. Weeks
Venezuelan Petrol.	H. M. Russell	J. G. Bohart

Oil Supply Advisory Committee—British Observers

Shell	S. J. Veenstra	A. G. Gregory
Anglo-Iranian	J. E. Anderson	D. G. Hitt
Secretary	J. Q. Johnson (Creole)	



A NEW star of the first magnitude is about to appear in the petrochemical galaxy to claim a share of the attention which has been centered on ethylene in recent years. The newcomer is benzene, for which two new recovery processes have been devised to supplement the methods previously employed by the refining industry.

Ethylene is not to be eclipsed by the newcomer—on the contrary, its recent spectacular rate of increase in output and demand will continue. Production now is four times as great as ten years ago and may be expected to be quadrupled again in the next ten years.

A similar rate of growth in demand is now being experienced in the case of benzene. Consumption in 1948 was 162 million gallons. By 1953 it is estimated by the National Production Authority that United States requirements will approximate 338 million gallons, an increase of more than 100 percent in five years.

Benzene is not, of course, a new product. It has a long history of usefulness for dyestuffs going back to the first decade of the century. Source of supply has been primarily from coal, but the coal-tar industry no longer can be expected to expand at a rate equal to the growth in demand for the aromatics it produces. The steel industry is growing, but not as fast as the chemical industry, and what is more serious, steel makers do not use as much coke per ton of metal as formerly. Imports from Europe have been an important source of supply, but this source will dry up as European chemical plants now nearing completion go on stream. Development of the new recovery processes thus come at an opportune moment.

Petroleum is not, of course, the only potential supply for aromatics. Coal hydrogenation may be employed or recovery may be had from oil shales. A Bureau of Mines paper on "Retorting Oil Shale at High Temperatures" by F. E. Brantley and others recently presented before the International Congress stated that very large quantities of aromatics are available from Rocky Mountain shale deposits. A 20,000-ton-per-day shale plant could produce 12 million gallons per year of nitration grade benzene plus important quantities of other chemicals, it was reported. Both coal and shale plants are said to be more expensive and to require more steel than oil refinery reforming and recovery equipment.

Benzene is not the only aromatic which is to find a growing market in the chemical industry. The xylenes and ethylbenzene are important. Currently, as in any time of war or preparation for national defense, there is a great surge of demand for toluene for special motor fuels and explosives. This will subside again, but not the demands for benzene, the xylenes and ethylbenzene which are needed for peace time purposes.

The current emergency demand for toluene from petroleum is the third such surge. In

Benzene From Petroleum

Two new processes have been developed for separating benzene and other aromatics from catalytic reformate.

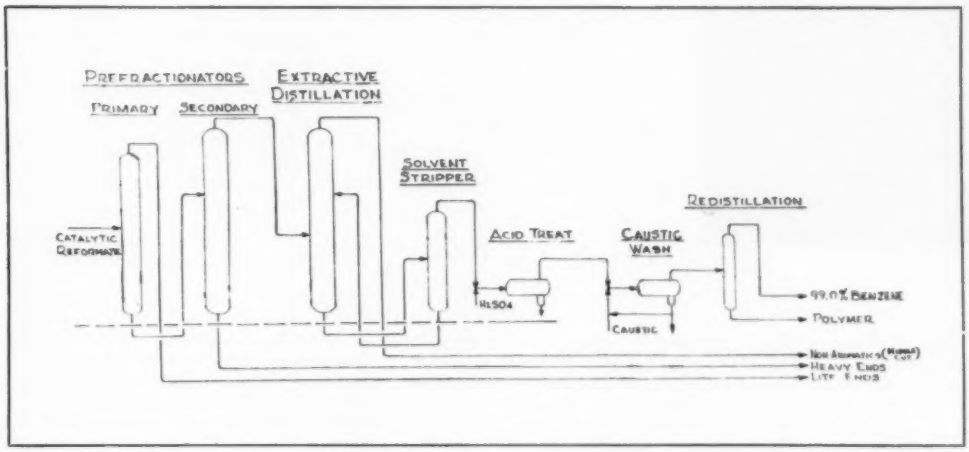


Fig. 1. Flow diagram of Shell aromatics recovery process for the recovery of benzene from catalytic reformate.

World War I small amounts were made by cracking. Between the two world conflicts the hydroforming process of catalytic reforming was developed to such a point that the refining industry was able to aid the war effort by producing vast quantities of synthetic toluene, far more than the coal-tar industry could hope to provide. Now again, oil refiners are asked to supply aromatics for avgas and explosives. This time refiners are expected to turn out very large quantities of benzene as well as toluene and on short notice.

Shell Development Company has a commercially developed process which is especially designed for the production of aromatics. In this process, concentrates of methylcyclopentane from straight run or natural gasolines may be isomerized to cyclohexane by catalysis. Cyclohexane then is dehydrogenated in a second catalytic step to produce benzene. Shell now considers that this process has been made obsolete by the new catalytic reforming processes which are simpler and more economical. The old World War II hydroformers and aromatics recovery units also are back at work to supplement coal-tar benzene sources. Petroleum-derived benzene this year will approximate 12 million gallons. In the meantime, certificates of necessity have been granted for new benzene plants with an annual capacity of 90 million gallons, about half of the benzene capacity of the coal-tar industry.

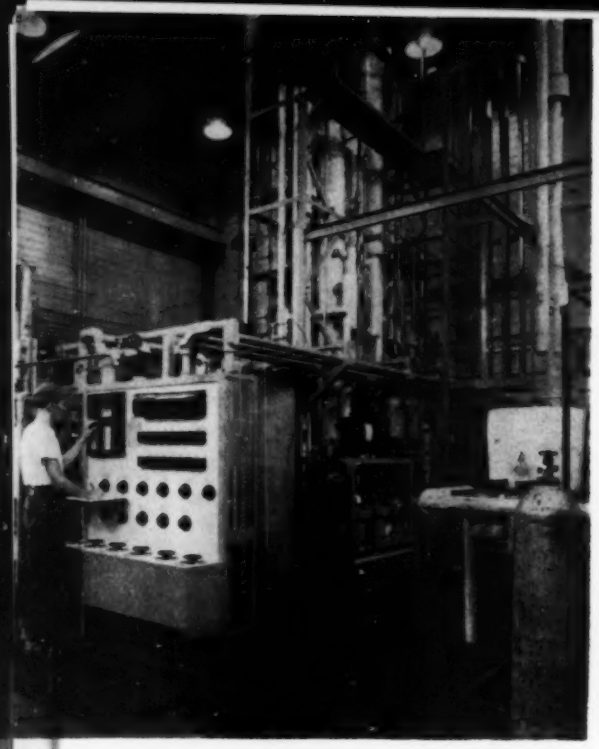
The United States is fortunate in that postwar research of the oil refining industry has developed a group of processes which will eliminate the current shortage of aromatics within a reasonable time. For the production of aromatics concentrates, several new or improved catalytic reforming processes have been perfected. First new post-war process in the field was Platforming, developed by Universal Oil Products Company and designed primarily for octane improvement of naphthas by dehydrogenation and isomerization of of a platinum-containing catalyst. There are now eight Platforming units in operation with a capacity of about 20,000 b/d and 16 other units planned or under construction which will have a charging capacity of 75,000 b/d. Some of the later units were designed especially for maximum production of aromatics rather than for octane improvement as was the case in the earlier units. Capacity of Platformers being built to recover aromatics is 46,120 b/d.

In addition to the UOP process, the New Jersey and Indiana Standard companies and the M. W. Kellogg Company have improved the hydroforming process by adopting the continuous fluid technique, and a number of other processes have passed the pilot-plant stage. Commercial units of the Houdriforming process and of Atlantic Refining Company's platinum catalyst process are under construction.

In recent weeks two new processes have been announced for separating and purifying the aromatics from reformate. Sun Oil Company has revealed a method of selective adsorption of aromatics with a special silica gel to be known as the Arosorb process. Dow Chemical Company has developed a liquid absorption process for recovery of aromatics through preferential absorption in diethylene glycol. Universal Oil Products Co. has done additional research work on the process and has made contributions, particularly in the case of certain equipment to be employed. The process is to be known as the UDEX process ("U" for UOP, "D" for Dow Chemical and "EX" for extraction).

Arosorb is to be licensed to the industry by Houdry Process Corp. and by UOP. UDEX will be licensed by UOP. Each has features which differ from the other. One process may be selected for maximum flexibility and the other for specialized production of maximum quantities of a specific aromatic.

During World War II, Shell Development Company's extractive distillation process was one of four employed to recover aromatics. Of the 15 plants built during the war, three were operated at Shell refineries and eight were built under Shell licenses by other refiners. Four refiners devised their own recovery methods. Of these, one used extraction with SO_2, one azeotropic distillation with MEK and one with methanol, while the fourth method involved extensive recycling of cracked naphthas. About half of the synthetic toluene produced during the war years was by Shell's phenol process. It is the principal method



Pilot plant at Sun Oil Company research laboratories in which test runs have been made of the Arosorb process for aromatics recovery.

U.O.P. PLATFORMING UNITS OPERATING AND BUILDING

Licensee	Location	Design Capacity BSD
*Old Dutch Refining Co.	Muskegon, Mich.	1,500
*Johnson Oil & Refining Co.	Cleveland, Okla.	1,843
*Kendall Refining Co.	Bradford, Pa.	1,500
*Bell Oil & Gas Co.	Grandfield, Okla.	1,500
*Aurora Gasoline Co.	Detroit, Mich.	4,500
*Premier Oil Refining Co. of Texas	Ft. Worth, Texas	1,500
*Mid-West Refineries, Inc.	Alma, Mich.	1,500
Taylor Mayfair Properties	Port Isabel, Texas	4,000
*Petroleum Specialties, Inc.	Flat Rock, Mich.	900
Bitumen & Oil Refineries, Ltd.	Matraville, N.S.W.	1,500
**Standard Oil Co. of Calif.	El Segundo, Calif.	12,100
Canadian Oil Refineries, Ltd.	Froomfield, Ont.	3,800
**Shell Oil Co., Inc.	Houston, Texas	16,000
**Cosden Petroleum Corp.	Big Spring, Texas	4,320
**Shell Oil Co., Inc.	Wood River, Ill.	3,400
Atlas Processing Co.	Shreveport, La.	4,400
Skelly Oil Co.	Longview, Texas	1,850
Anglo-Iranian Oil Co. Ltd.	Llandarcy, Wales	6,000
**Eastern States Petroleum Co., Inc.	Houston, Texas	4,500
**Roosevelt Oil & Ref. Corp.	Mt. Pleasant, Mich.	1,800
Elk Refining Co.	Falling Rock, W. Va.	1,500
**Great Southern Chemical Corp.	Corpus Christi, Texas	4,000
Wilcox Oil Company	Bristow, Okla.	1,500
* Operating ** Aromatics	Total 23 units	85,413

currently being used to recover benzene from hydroforming units of World War II vintage, and additional units are being installed in connection with some of the new catalytic reformers.

First commercial plant for the recovery of nitration grade toluene by extractive distillation began operating in 1940 at Shell Oil Company's refinery at Houston, Texas. Due to the war time emergency, the plant was built on the basis of laboratory work, without the usual pilot-plant studies. Fortunately the process worked well from the start and produced large quantities of nitration grade toluene for the war effort.

The process involves three steps: (1) prefractionation of charge stock, (2) rejection of non-aromatics and (3) sulfuric acid treatment of aromatics to bring the product to nitration grade.

In the prefractionation step, two columns are operated to remove maximum volumes of non-aromatics while holding aromatics losses to a minimum. The product of this step is a narrow boiling point mixture of saturates and the desired aromatic. Volatility of the constituents is so nearly identical that normal fractionating methods will not complete the separation.

Second step involves extractive distillation with phenol in a column which contains an extraction section for recovery of the aromatic and a knock-back section for rejecting solvent from the product. Overhead from the column contains essentially all of the non-aromatics and perhaps a trace of solvent. Bottoms from the column is a mixture of aromatics and phenol which are subsequently separated in a stripping column as indicated in the accompanying flow diagram (Fig. 1).

When phenol is introduced into a column containing mixed aromatics and non-aromatic vapors of narrow boiling point range, the relative volatility of the components is changed radically. The paraffins become relatively more volatile and the benzene (or other aromatic) relatively less volatile. Result is that the two may be fractionated in a relatively simple column. Phenol was chosen as a selective solvent also because of its thermal stability and because it has a high solubility for aromatics but is non-reactive to most hydrocarbons excepting the diolefins, which are not present in the usual charging stock in appreciable quantities.

The Shell phenol process produced about half of the 169 million gallons of toluene recovered from petroleum in 1944. The total recovered from oil was more than four times the volume produced by the coal-tar industry. Without these processes or some substitute of similar effectiveness, the Allied powers would not have been able to carry on such a devastating bombing attack.

During the war, the Shell process was used exclusively for the production of toluene, which was in greatest demand at that time. Although benzene is more difficult to recover than toluene, the process has been adapted successfully to the new task. In either case the Shell process gives high recovery of a finished aromatic meeting nitration grade specifications. Table I (page 76) is a simplified material balance taken from a Shell process run to illustrate a typical case of recovery of benzene from a catalytic reformate.

Newer processes which have been announced in recent weeks do not require prefractionation. Complex mixtures of wide boiling ranges of aromatic and non-aromatic products are separated. Subsequent fractionation of the aromatic stream is not difficult except in the case of para- and meta-xylenes where special procedures must be adopted.

Work on the Sun Oil Company's Arosorb process was undertaken more than eight years ago. Original research was to find a means of producing high solvency solvents and of improving the diesel index and cetane number of catalytic gas oil so that it would be considered satisfactory for diesel fuel. The processing of gas oil fractions also will improve the burning characteristics of cracked furnace oil, although this is not now considered economical. The goal of the researchers was to find a suitable method of processing cycle stock to remove aromatics and thus restore straight run qualities lost in the catalytic reactors. In the post-war years there was no incentive to recover the lower boiling point aromatics from motor fuel stocks. Benzene was not too scarce and there was no large demand for toluene.

While the first commercial unit of the Arosorb process is to be employed for benzene, toluene and xylene recovery, it is being designed to handle heavier stocks as well. Once the emergency period is ended, Sun will consider whether it wishes to continue producing one or more of the light aromatics from reformate or whether the reformed naphtha will be more valuable in the company's scheme of operation to upgrade motor fuel.

One method of operation would be to run primarily for benzene. In such an operation the reformate might be prefractionated to concentrate the benzene in a light cut prior to the Arosorb treatment. Table II gives various pertinent figures based on pilot-plant studies of such an operation. It will be noted that in this plan of operation the saturate product returns to an octane number of 60 after stripping out the benzene. The finished benzene is of industrial grade with a boiling point range of 1.6°C and an acid wash color of less than two after treatment.

Another method of operation might be to produce both benzene and toluene from a pre-

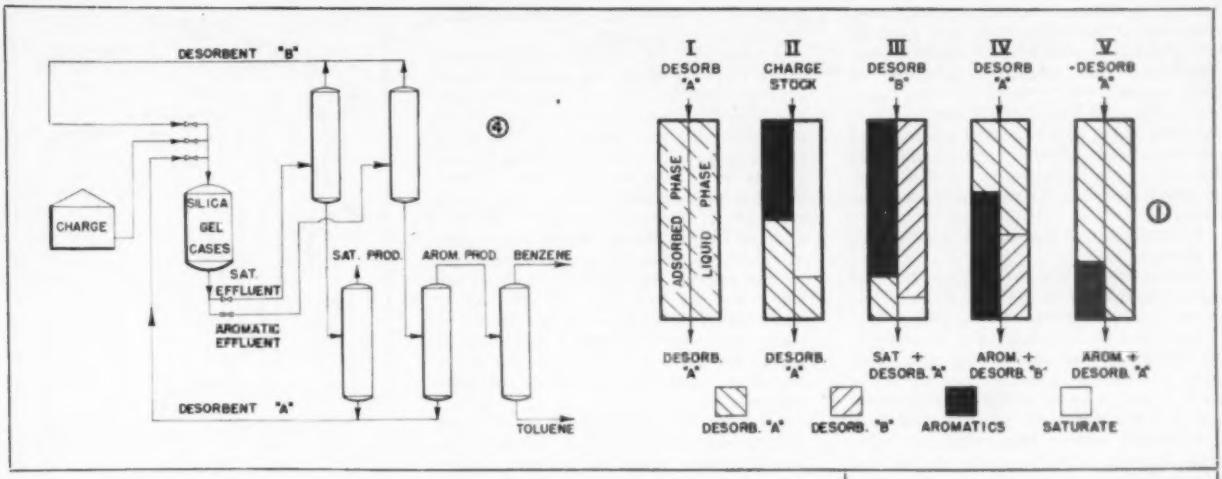


Fig. 2. Flow diagram of Arosorb process for recovering benzene and toluene by adsorption with silica gel.

Fig. 3. Chart indicating five steps in the Arosorb process which constitutes a complete cycle.

fractionated reformate. Data showing pilot-plant results of such a scheme are shown in Table III.

The Arosorb process does not limit itself to catalytic reformate or cycle stock. Pilot-plant runs suggest that it can be useful in the recovery of highly aromatic mineral spirits from straight run naphtha. In such an operation the saturate product also would have special values due to its boiling point range and lack of odor. Table IV gives results of this type of operation.

As mentioned previously, the first Arosorb work was done on catalytic gas oil. Table V reveals how the saturate product of an Arosorbed gas oil is improved by removal of aromatics. In this run of a gas oil containing 42 percent aromatics, the Diesel Index is improved from 35 to 74 and the cetane number from 34 to 67. Boiling point range of the saturate is somewhat lower than that of the aromatic product.

Thus far the chemical industry has not developed a demand for the higher boiling aromatics which might be recovered from cycle stock. The field is one which may well invite the attention of researchers, since the lower boiling fractions have proved valuable for so many years. At present, the aromatic concentrate removed from catalytic gas oil may be blended with residual fuel to improve its viscosity and compatability. The Texas Co. is following this plan at its Eagle Point, N. J. refinery where high boiling aromatics are extracted with furfural.

Fig. 2 is a simplified flow diagram of an Arosorb unit designed to produce benzene and toluene from a prefractionated reformate from which the xylenes have been removed. In this example, the mixed stream of benzene, toluene and saturates is passed through a vessel containing a special type of silica gel developed by Davison Chemical Corp. in cooperation with Sun. The gel preferentially adsorbs the aromatics and rejects the saturates. When adsorbing capacity is reached, the supply of reformate is shut off and the gel bed desorbed.

Fig. 3 is a chart designed to indicate the various steps in the complete cycle. At Step I the silica gel case is filled with Desorbent "A," which may be a mixture of xylenes. At Step II, the reformate is injected, with the result that the benzene and toluene are preferentially adsorbed by the gel, displacing the xylenes, while the saturates fill the liquid space. At Step III, after maximum adsorption of benzene and toluene, Desorbent "B," which may be butanes, is introduced to drive out the saturate from the liquid space.

Once the saturate fraction of the reformate has been displaced, the cycle is changed again to admit Desorbent "A" (xylenes) which drive out remaining butanes and aromatics.

Fig. 4 is a digram in which the composition of gel case effluent is shown at various points in the cycle time. Cycle time is about 100 minutes. With a group of six gel cases, the operation becomes, in effect, continuous. Cycle timers control the flow automatically. Effluent is switched from saturate to aromatic product line by an instrument developed by Sun which continuously measures refractive index of the stream. Valves are automatically operated when the desired characteristic of the stream is reached. The exact point of change is based on desired purity of aromatic product. If a product of 98 percent purity is required, a point will be selected which will give an aromatic yield of about 90 percent, but if a lower purity is satisfactory, say 90 percent, then the instrument may be set to give an aromatic yield of about 98 percent. Intermediate values also are possible.

As indicated in the flow chart, the aromatic effluent from gel cases is passed to a tower from which the butane Desorbent "B" is removed overhead. In two subsequent steps, xylenes are removed from the aromatic stream for recycling as Desorbent "A" and the mixture of benzene and toluene is fractionated in a final column. Similarly the saturate effluent is fractionated prior to recycling, butane being removed overhead and the bottoms subsequently being denuded of xylenes.

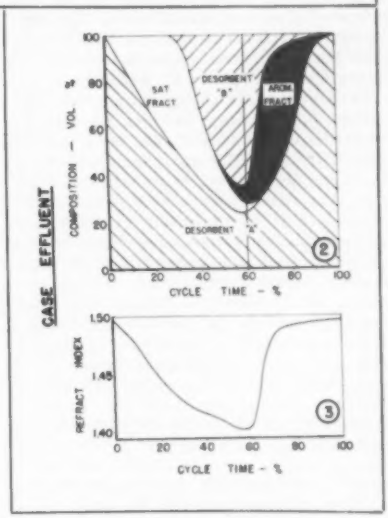


Fig. 4. Diagram indicating composition of gel case effluent during a complete Arosorb cycle.

The Udex Process, which was developed by Dow Chemical Co., is being engineered and licensed to the petroleum industry by Universal Oil Products Co. It has been demonstrated that this process can obtain high recoveries of chemical grade benzene, toluene, and xylenes from a variety of wide-boiling and aromatic-containing streams such as Platformate, the product of Universal's Platforming process. One of the principal advantages of the process lies in the fact that it is not necessary to concentrate a given aromatic hydrocarbon in the feed stock to the unit when producing a high yield of nitration grade product. Instead, it is possible to feed a hydrocarbon stream containing, for example, as little as ten percent of a mixture of benzene, toluene, and xylene and produce an extract from which nitration grade benzene, nitration grade toluene, and high purity mixed xylene and ethylbenzene can be separated by simple distillation.

This separation process employs a glycol-water mixture as a solvent which has both high selectivity and good solubility proper-

ties for aromatics in aromatic-paraffin mixtures, and is immiscible with such mixtures throughout the entire range of aromatic concentration. This unusual combination of these desirable properties in an inexpensive, practical solvent was of major importance in the development of a successful process. The relation between selectivity and solubility for this solvent can be varied over a wide range by simply adjusting the water content of the mixture.

A simplified flow diagram of a Udex unit is shown in Fig. 5.

The process utilizes an extractor, the rich extract from which is fed into a solvent recovery column wherein the aromatics are stripped and the lean solvent is returned to the extractor. The wide boiling range aromatic concentrate recovered from the stripper is in part returned to the extractor as reflux, and the remainder provides feed to a fractionation system from which nitration grade benzene, nitration grade toluene, and xylene-ethylbenzene concentrate of high purity can be obtained as products. The bottoms from the xylene fractionator represent a concentrate of C_9, C_{10}, and C_{11} aromatics.

In the operation of the extractor-stripper system, full advantage has been taken of the properties of the solvent. The facts that the selectivity and solubility characteristics of the glycol not only can be varied at will, but also change relatively slowly with temperature, permit the extractor to operate at stripper reboiler temperatures. Thus, but for the temperature drop across the stripper, the system operates isothermally, heating and cooling of the solvent is reduced to a minimum, and utilities requirements are substantially lowered. The glycol-water system is very similar in non-corrosive properties to that used in automobile cooling systems, so that carbon-steel equipment is employed throughout, obviating the use of special alloys. Further, operating pressures are only those needed to maintain liquid phase conditions in the extractor, and consequently no high pressure equipment is necessary.

Glycol-water solutions have other useful properties. At operating temperatures, the viscosity of the solvent is only slightly greater than that of water so that pumping and handling problems are correspondingly simplified. The solvent also has the property that at the operating temperature the glycol vapor pressure is extremely low, permitting an easy separation of aromatics from the glycol by distillation, with the glycol as a bottoms product, while the water vapor pressure is sufficiently high to result in a low stripper reboiler temperature. The low solubility of glycol in nonaromatic hydrocarbons, and its high solubility in water, permit solvent losses to be substantially prevented without the necessity for distilling the raffinate.

The large difference in specific gravity between the solvent and hydrocarbon, combined with the fact that the interfacial tension for this system is relatively high, were two properties utilized in the development of a liquid-liquid extraction unit specially designed for this process. Also significant is the fact that troublesome stable emulsions are not encountered. The extraction column employs a type of tray design, especially developed for this process, which effectively handles 1,000 gallons per hour of solvent per square foot and maintains a constant phase ratio with conventional control equipment. No internal mixers or agitators are necessary.

A pilot plant of approximately five theoretical extractor stages was operated successfully and continuously for an extended period; operation was smooth and stable, and little operating labor was required. A wet, wide-boiling range Platformate containing 63 mole percent total aromatics was used as feed. Based on the aromatics in the feed stream, recoveries of 99 weight percent on the benzene, 98 weight percent on the toluene, and 91 weight percent on the xylene were obtained in the aromatic concentrate, which consistently analyzed less than 0.2 mole percent nonaromatics. During this period, the process steam consumption ranged from 10 to 15 pounds per gallon of feed to the extractor, depending upon the operating conditions employed.

A typical true boiling point curve of the aromatic concentrate is shown in Fig. 6. The aromatics were separated by batch distillation and no intermediate cuts were discarded. The ASTM specifications and the test results are shown in Table VI. The samples used for tests are as indicated in Fig. 6:

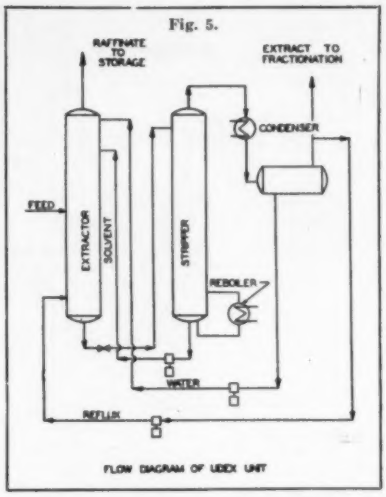
Cut 2 boiling between 80 and 95°C
Cut 3 boiling between 95 and 120°C
Cut 4 boiling between 120 and 145°C

Two commercial units have been licensed; one is under construction and the other is being designed. Several additional units are being negotiated.

This year the consumption of chemical grade benzene is estimated by L. A. Schlueter of the National Production Authority at 232 million gallons, of which about 75 percent is concentrated in markets for styrene, synthetic phenol, nylon, aniline and synthetic detergents. The remaining 25 percent of the market is scattered among many uses, among which insecticides is an important segment. About a third of the current supply is going to styrene and although some part of this demand may be classed as "war emergency," it seems certain that the synthetic rubber industry in the United States is here to stay and to expand. Uses for synthetic fibers such as nylon and for plastics may be expected to expand in normal times.

Potential capacity of the petroleum industry to supply aromatics is very great. By catalytic reforming of all suitable fractions of straight run naphthas, it is estimated that the industry could produce a volume of aromatics equal to about one percent of the total oil supply. In a recent paper before the American Institute of Chemists, Dr. Gustav Egloff of Universal Oil Products Co. suggested that the benzene potential from crude this year is 825 million gallons, and that natural gasoline could produce an additional 120 million gallons. Dr. Egloff thinks that by 1955 the supply might reach 1,265 million gallons.

Fig. 5.



FLOW DIAGRAM OF UDEX UNIT

The potential supply of toluene is twice as great as that of benzene, and of the xylenes and ethylbenzene three times that of benzene.

Peacetime demand for toluene from petroleum is not great but it is anticipated that the xylenes and ethylbenzene will command a large market in the future. Ethylbenzene may be employed to reduce the benzene shortage for the production of styrene and other materials. Ortho-xylene can be relied upon to relieve the current shortage of naphthalenes which has been increasing in severity. It also is being used as a source material for phthalic anhydride. The paint and varnish industry may be expected to use increasing quantities of ortho-xylene as a naphthalene substitute. The new synthetic fiber Dacron based on paraxylene appears to have a great future because of its special qualities as a wool substitute and for other textile purposes

Separation of the ortho-xylene isomer from the meta- and para-xylenes and ethylbenzene is not difficult. The separation of meta- and para-xylene and of ethylbenzene is more tricky. Recovery of meta-xylene is being done commercially, however, at the present time. Without separation these three isomers are valuable for use as aviation gasoline components and as solvents.

TABLE I

Shell Aromatics Recovery Process

Nitration Grade Benzene from Catalytic Reformate

Material Balance
(Solvent Free Basis)

	Charge		Top Product		Bottom Product	
	BPSD	% v Benzene	BPSD	% v Benzene	BPSD	% v Benzene
Primary Prefractionator	5260	9.9	1140	0.5	4120	12.5
Secondary Prefractionator	4120	12.5	1460	34.6	2660	0.4
Extractive Distillation	1460	34.6	955	0.6	505	99.0
Solvent Stripper	505	99.0	505	99.0	Solvent	
Redistillation	505	98.6	500	99.0	5	60.0

Recovery: 95.0% of benzene present in reformate.

TABLE II

BENZENE CATALYTIC REFORMATE

	Charge	Saturate Product	Aromatic Product
% of Charge	100	75.7	24.3
% Aromatics	26.3	3.6	97
Sp. Gr. 60°/60°F.	0.743	0.700	0.877
Acid Wash Color			4
Acid Wash Color after treat			<2
Barrett Dist.			
Init. °C.			78.7
Dry Pt. °C.			80.3
$H_2S + SO_2$			Neg.
Octane No. (F-1 Cl.)		60	

TABLE III

BENZENE-TOLUENE CAT. REFORMATE

	Charge	Saturate Product	Aromatic Products Benzene	Toluene
% of Charge	100	67	17	16
% Aromatics	36.2	5.5	97	99
Sp.Gr. 60°/60°F.	0.763	0.708	0.877	0.871
Acid Wash Color			4	3
Acid Wash Color after treat			<2	<2
Barrett Dist.				
Init. °C.			78.5	109.8
Dry Pt. °C.			80.2	111.1
$H_2S + SO_2$			Neg.	Neg.
Octane No. (F-1 Cl.)	72.1	63		

TABLE IV

300-400°F. STRAIGHT-RUN CUT

	Charge	Saturate Product	Aromatic Product
% of Charge	100	85	15
% Aromatics	15	1	95
Gravity °API	47.4	51.1	30.2
ASTM Dist.			
Init. °F.	298	284	306
10%	318	316	321
50%	334	337	337
90%	354	356	355
E.P.	400	406	398
Aniline Point (°F.)	127.0	150.4	—
Mixed Aniline Pt. (°F.)	140.7	—	67.6
% Sulfur	0.019	0.010	0.026
Flash-T.C.C. (°F.)	102	94	111
Kauri-Butanol Solvency cc/70°F.	38.3	32.4	92.4

TABLE V

CATALYTIC GAS OIL

	Charge	Saturate Product	Aromatic Product
% of Charge	—	60	40
% Aromatics	42	7	95
Gravity (°API)	28.5	41.0	9.5
ASTM Dist.			
Init. °F.	472	450	470
10%	491	494	491
50%	516	516	518
90%	566	570	581
E.P.	608	604	634
Aniline Point (°F.)	122.0	180.0	—
Mixed Aniline Pt. (°F.)	134.2	—	60.1
% Sulfur	0.16	0.06	0.25
Pour Point (°F.)	+5	+20	−30
NPA Color	1¾	1¼	4¼
Flash Point (P.M.C.C.) °F.	225	204	245
Vis. (SUS/100°F.)	35	36.5	36.3
Diesel Index	35	74	—
Cetane No.	34	67	—

TABLE VI

Benzene and Toluene Distilled from UDEX Pilot Plant Aromatics Concentrate Compared With ASTM Specifications

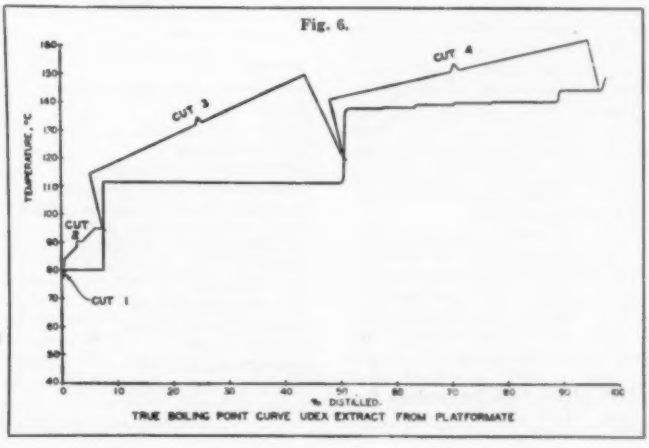
	ASTM Benzene Specifications	Cut 2	ASTM Toluene Specifications	Cut 3	Cut 4
Specific Gravity 15.56/15.56 ASTM D-891	0.8820 to 0.8860	0.8849	0.8690 to 0.8730	0.8718	—
Color ASTM D-853	Not darker than solution of 0.0030 gr. $K_2Cr_2O_7$ in 1 liter of water	Passed	Same as for Benzene	Passed	—
Solidification Point (Anhydrous) ASTM D-852	Not lower than 4.85°C	5.21°C	—	—	—
Acid Wash Color ASTM D-848	Not darker than No. 2 Standard	Passed	Same as for Benzene	Passed	—
Acidity ASTM D-847	No evidence of acidity				
Paraffins ASTM D-851	No Paraffins				
Sulfur Compounds ASTM D-853	Free of H_2S & SO_2				
Copper Corrosion ASTM D-849	Copper strips showed no discoloration				
Mole Percent Aromatics		99.5+		99.5+	99+
Total Distillation Range at 760mm. ASTM D-850	Not more than 1°C including 80.1° C	IBP—79.3 5% 79.9 10 80.0 20 80.1 30 80.1 40 80.1 50 80.1 60 80.1 70 80.1 80 80.1 90 80.2 95 80.2 Dry Pt. 80.3	Not more than 1°C including 110.6+ 0.1°C	IBP—110.2 5% 110.5 10 110.6 20 110.7 30 110.7 40 110.7 50 110.8 60 110.8 70 110.8 80 110.8 90 110.9 95 110.9 Dry Pt. 111.2	—

Removal of substantial quantities of aromatics from catalytic reformate will not be done without substantial effect on gasoline quality. Removing benzene from reformate will not seriously affect the anti-knock blending value of reformate for motor fuel. It has a value of 100 which is not far above the blending value of good reformate.

On the plus side of the picture, it is likely that isomerization of saturate naphthas will be undertaken. As long as a naphtha stream contains substantial quantities of non-paraffinic hydrocarbons, the isomerization reaction is not easily accomplished. Once the stream has been robbed of the aromatics the process becomes feasible.

As long as the emergency lasts the refiner will continue to adjust his operations to produce maximum quantities of the petrochemicals most urgently needed for national defense. As facilities are installed for producing the aromatics, the refiner will have achieved a flexible position which will enable him to regulate his operations to supply the best possible motor fuels and maximum quantities of valuable chemicals.

Fig. 6.



Italy Continues Expansion

Refinery	Location	Capacity, tons per year 1938	1951 Est.	1952
API	Falconara	...	300	500
Aquila	Trieste	300	480	600
Bianchi Petroli	Cologno M.	...	25	52
Condor	Milano	...	...	900
Dica	Apuania	...	50	50
Esso Stand. It.	Trieste	100	130	130
Garrone	Genova	...	58	58
INCIP	Mantova	...	...	180
INPET	La Spezia	300	820	1,550
IRCO	Trieste	...	8	8
IROM	Venezia	375	780	950
Lombarda Pet.	Monza	10	110	110
Nilo	Milano	...	15	20
Permolio	Mi-Ge-Roma	140	280	335
Petroli D'Italia	Fiorenzuola	15	45	90
Raff. Toscana	Firenze	...	50	100
RAI	Piacenza	...	2	2
RASIOM	Augusta	...	350	350
ROL	Viguzzolo	...	45	50
ROMSA	Fiume	125	...	...
SARPOM	Trecate	...	...	585
Socony Vac. It.	Napoli	220	1,600	1,600
STANIC	Ba-Livorno	250	1,600	1,800
SPI	Fornovo T.	...	15	15
STOI	Firenze	...	20	45
	Totals	1,825	6,563	10,080

General view of STANIC refinery at Naples.

WHEN the oil committee of the OEEC prepared its first report on refinery expansion in Europe, its guiding rule was the provision of additional processing capacity sufficient to meet the internal requirements of each of the countries included within the scope of the Marshall Plan's operation. In certain cases it was deemed advisable to include provision for a limited export of petroleum products to nearby areas where the installation of local facilities seemed unlikely.

On this basis, the original proposal, after preliminary modification, was to increase Italy's refinery output to 8,921,000 metric tons by 1953. This quantity, plus provision for 717,000 tons of imports, was estimated as sufficient to cover an anticipated demand for slightly under seven million tons for inland consumption and to allow something over two and a half million tons for bunkers for export to other OEEC countries.

TABLE I

Refinery	Revised Program of 1951
API refinery—Falconara (Ancona)	500,000
Aquila—Trieste	600,000
Condor—Rho (Milan)	1,000,000
INCIP—Mantova	180,000
INPET (Shell)—La Spezia	1,500,000
IROM—Venice (Porto Marghera)	950,000
Lombarda Petroli—Villasanta (Milan)	90,000
Permolio—Genoa, Rome, Milan	340,000
RASIOM—Augusta (Syracuse)	315,000
SARPOM—Trecate (Novara)	585,000
ROL—Viguzzolo	48,000
ESSO Italiana—Trieste	120,000
SIROM—Monza (Milan)	52,000
STANIC—Bari	700,000
STANIC—Leghorn	1,100,000
Socony Vacuum Italiana—Naples	1,600,000
	9,680,000

Later, in view of increasing demand both for domestic use and for export, and particularly in view of the cessation of product shipments from Iran, it was deemed advisable to increase refining facilities. At the time when the revised report of OEEC was prepared early in the present year, it was impossible to determine whether the suspension of operations in Iran would be temporary or prolonged. It was not assumed that it would last for an extended period, and accordingly the OEEC proposal, raised the program for refining capacity in Italy only to 9,680,000 metric tons annually. The projected output of refineries in operation or under construction is shown in Table I.

The principal enlargements resulting from this revision were those of Socony-Vacuum at Naples to 1,600,000 tons, Aquila at Trieste to 600,000, API at Falconara to 500,000, Stanic at Bari to 700,000 and inclusion of

Of Refining Facilities

Reforming unit at AQUILA refinery at Trieste.

Aerial view of Socony-Vacuum refinery at Naples.

Petroli d'Italia's plant at Piacenza for 90,000. On the other hand there were reductions in projected capacity of some plants.

In view of the changed situation, the Italian government decided to reconsider the application of Compagnia Importation Carburanti S.A. (CICSA) for the erection of a refinery of 200,000 tons yearly capacity at Porto Nogaro. The government has indicated, though not by official announcement, that should the coal supply become more difficult, provision of further refining capacity may have to be considered. According to present indications, Italy will have to import during 1952 some 200,000 tons of aviation benzene and 120,000 tons of fuel oil besides its crude imports.

In September ECA approved the expenditure of $18 million for the erection of an olefin plant at Ferrara, to be engineered by the M. W. Kellogg Co. and operated by the Montecatini Co. It is designed to produce annually 10,000 tons of ethylene and a like amount of propylene, besides smaller quantities of butadiene, styrene and diacetone alcohol.

In a report presented at the mid-year meeting of the Unione Petrolifera Italiana, it was shown that during 1950 about four million tons of crude and residues were run to stills, an increase of a million tons over 1949 and more than 2,300,000 tons more than pre-war (1938). It was also reported that by 1952-53 Italian refineries would be in a position to process 10,000,000 tons a year. It was stated that up to that time 35 billion lire ($58 million) had been spent in reconstruction, and that an additional 30 billion would be required to complete projects under way.

From roundly four million tons of crude treated in 1950 there was produced 3,650,116 tons of finished products as follows:

Products	Tons
Gasoline	717,199
Kerosine	177,863
Gas Oil	777,510
Fuel Oil	1,718,144
Lubricants	57,463
Bitumens	173,419
Other products	28,518

Of the crude imported in 1950, approximately 55 percent came from dollar areas and 45 percent from sterling areas, the latter being mainly of Persian Gulf origin. The cost of these imports was $29,504,437 and £1,705,400 respectively. At the present time a larger part of the Middle East crude is coming from the Mediterranean ports of Sidon and Tripoli, which are the terminals of the Saudi Arabia and Iraq pipe lines.

As an illustration of the growing tendency toward higher compression engines in automobiles and consequent demand for higher octane fuel, Dr. Ing. Diego Guicciardi of Aquila, in a press conference on the inauguration of the new refining additions to its plant at Trieste, pointed out that it includes reforming equipment developed by Universal Oil Products Co. for the production of high-test benzene as well as provision for the separation of butane and propane and for high grade kerosine suitable for motorization. Another new feature of the plant is the lubricating oil unit, capacity 30,000 tons yearly.

During the past year the Italian refineries made a notable improvement in the quality of their products, especially their gasoline. The standard grade now has a rating of 70/72 octane. The quality of fuel used in agricultural operations also has been improved and a beginning has been made in the production of lubricants which formerly were imported.

In connection with other developments in the oil industry, it is to be noted that four large tankers have been constructed, one of 28,000 deadweight tons for the Flotta Lauro of Naples, and three of 18,000 tons, two of which were for AGIP and one for the Bibolini Co. of Genoa. The Flotta Lauro has recently ordered two more 26,000-ton turbotankers from the Ansaldo yards at Genoa. The Italian government, realizing that most of the T-2 tankers put under the Italian flag in 1946-47 will have to be replaced in the near future, has indicated its willingness to aid in the construction of another 150,000 tons of tankers in Italian yards.

This well blew out and ran wild for 43 days before it could be controlled. Photograph shows the blow shortly after it had reached maximum volume and before crater began to form. The cavity eventually reached a depth of more than 100 feet, extending over an acre of ground.

When Is A Blowout?

By Elton Sterrett
Industrial Consultant, Houston, Texas

ONE of the principal hazards involved in drilling a deep well lies in the possibility that the drill bit may at any instant enter a high-pressure gas zone where the subterranean pressure exceeds that exerted by the column of weighted drilling fluid in the hole. When this occurs, there is danger that the mud may be ejected from the hole and loss or damage to the drilling operation and equipment may result. The contractor, to safeguard himself against these risks, prudently takes out blowout insurance to cover the major portion of his equipment and investment in the hole.

Oil field understanding of the term "blowout" until recently followed a more or less generally accepted pattern, despite the fact that none of the standard unabridged dictionaries available in the public libraries carries any recognition of the subterranean phenomenon. Porter, in his "Petroleum Dictionary" defines the term thus:

> "Blowout. A sudden or violent escape of gas, as from a drilling well when high-pressure gas is encountered and preparations to prevent, or to control the escape, have not been made."

A standard definition, adopted practically verbatim by a number of insurance companies participating in the protection of drilling rigs against the hazards outlined, reads as follows:

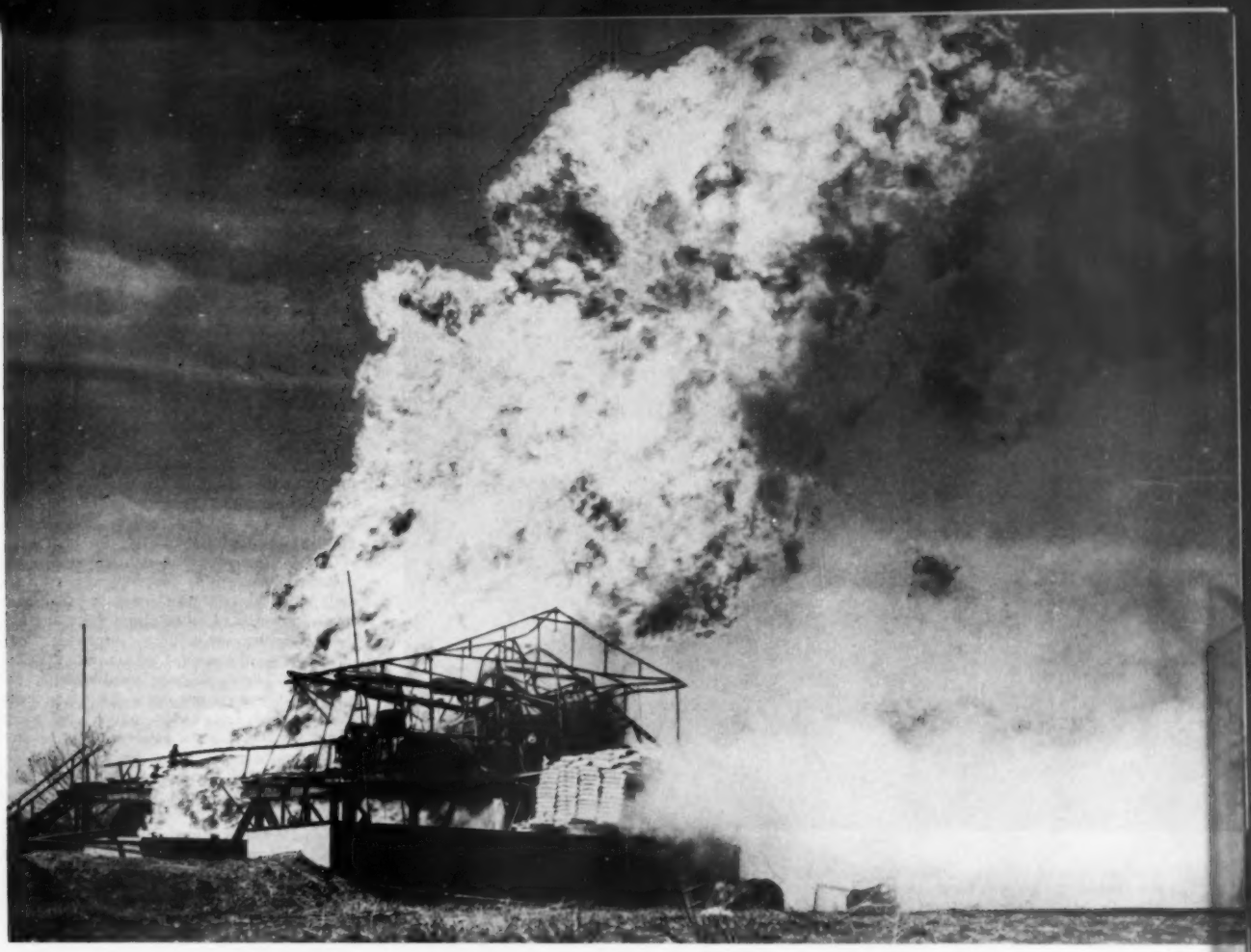
> "The term 'Blowout' shall be defined as a sudden expulsion of drilling fluid (mud, water and sometimes oil) followed by an uncontrolled flow of oil, gas or water from an uncompleted well that occurs when the pressure of oil, gas or water entering the hole at some depth is greater than the pressure exerted by a column of drilling fluid in the hole."

An added paragraph in the standard endorsement covering blowout and cratering defines "crater" and affords further light on the basic phenomenon of blowout. It reads:

> "The term 'Crater' shall be defined as a basin-like opening in the earth's surface surrounding a well caused by the erosive and eruptive action of the gas, oil and water flowing without restriction."

The fundamental interpretations of two terms which enter into drilling equipment insurance phraseology have been to a large extent voided, or at least severely curtailed, by a recent court decision and affirmation of that court's ruling by the Court of Appeals having territorial jurisdiction. The case was styled "J. Coulter Means vs. Georgia Home Insurance Company," and was filed as Case CA 1617, District Court of East Texas, sitting at Beaumont, Texas.

The drilling contractor, J. Coulter Means, had on November 30, 1947, taken out for a period of one year insurance against blowout and crater damage to one of his rigs in the amount of $120,000 on which he paid a premium of $3,600. On June 11, 1948, when he



was then engaged in drilling a wildcat well near Orange, Texas, to a contract depth of 10,900 feet, Means added $65,000 to his coverage by paying an additional premium of $611.46, so that the insured interest in his drilling equipment then amounted to $185,000.

The insurance contract provided that the well be protected during drilling by the installation of certain protective devices, listed in the insurance policy endorsement as:

"(a) MASTER GATE (DRILLING) VALVE: An approved type Master Gate valve of .... pounds test pressure which will be set on the surface casing as soon as the surface casing is set. If manually operated, same shall be equipped with large master handwheel for opening and closing of same, and master handwheel shall operate from stem extending out beyond the derrick floor. An approved 'Blowout' preventer equipped with blind rams (thus acting as a Master Gate Valve) of similar capacity shall be acceptable as complying with this provision.

"(b) BLOWOUT PREVENTER: An approved Blowout Preventer of .... pounds test pressure will be set on the surface casing below the drill floor, same to be installed and tested in accordance with standard practice."

Contractor Means, in conformance with what are considered sound precautionary measures when drilling to the contracted depth in the Gulf Coast area, not only complied with the insurance endorsement provisos, but he also added a second blowout preventer, so that the well-head equipment incorporated two blowout preventers and a master valve, all of 10,000-pound test, separated by spools which carried the customary vent outlets and necessary high-pressure control valves and chokes.

On August 10, 1948, while drilling at a depth of 10,612 feet, and having in the hole mud weighing 13.6 pounds to the gallon with a viscosity of 60, a "kick" was noted in the well, and the preventers were closed around the drill pipe to restrain uncontrolled flow through the annulus surrounding the string.

Pressure rapidly built up against the preventer rams, and it was found impossible to initiate a flow of mud through the drill pipe in the effort to mud off the high gas pressure encountered. By means of the vent line connections, an attempt was made to bleed off pressure through the choke line tied into the spool set into the well-head make-up. This was and is a standard procedure when excessive annulus pressures are built up. Flowing pressures at this time were recorded in the range of 6,500 to 6,600 psi.

During the bleeding-off process, the outer or discharge end of the choke or relief line vibrated rapidly, and as a result of this excessive vibration some seven feet of the pipe was broken off and thrown free of the remainder. No damage, however, was sustained

Here the blowout brought to the surface bits of rock which, in striking the steel of the derrick, ignited the escaping stream of millions of cubic feet of gas and added a fire-fighting problem to that of controlling the gas. The photograph below shows the same well when the channel through which the flow reached the surface had been partially blocked. The flames abated to reveal the complete ruin of the drilling equipment.

Another blowout disaster. After the gas flow was ignited, the gigantic torch continued to illumine the countryside until cratering brought about a down-the-hole bridge which snuffed the flame.

The cratering of the well in the preceding photograph spewed up rock and sand to form a dike around the well site. Here bulldozers have partially refilled the cavity, while a temporary truss supports the stub of casing protruding upward through the debris until a firm foundation can be constructed.

by the control valves or the blowout preventer assembly, and at no time, according to well logs kept at the time, during the attempt to reduce pressures and to restore mud flow into the well was there any flow of mud, water or gas around or through preventer rams or any other well-head fitting other than that permitted through the choke line. This flow was regulated by a 20/64-inch choke, which remained operable throughout the attempt to control the well.

Following the kick and flow through the choke line, the well bridged over, locking the drill string so tightly in the hole that subsequent washover and fishing attempts at freeing the pipe were unsuccessful, and it was finally considered necessary to plug back over the drill pipe abandoned in the hole and to sidetrack at that point.

When the insurance company denied liability under its policy and blowout endorsement for the drill pipe abandoned below the plug, suit was filed to recover the value of the pipe and hole lost, alleging that, at the time the loss was sustained, the well was "out of control in the hole"—this though the blowout preventers were successfully closed, and all flow at the surface was through the choke-controlled relief line, the outer end of which bore the only damage occurring at the surface.

The trial court's decision was in favor of the contractor and against the insurance company. Basing its ruling on the evidence and pleadings introduced at the trial, the Court of Appeals sustained the lower tribunal, and judgment was entered for the losses as set forth by the contractor.

Only in those areas where high-pressure gas zones are likely to be encountered during the drilling of a well must blowout hazards be taken into account when rigging up, and also when insuring, the drilling equipment. Complete data on the number of blowouts, "kicks" and other down-the-hole manifestations of high gas pressures are not available, as many "kicks" which are quickly snubbed and which do not result in losses believed to be covered by insurance appear solely as a recorded detail on the daily drilling log of the well in question. Perhaps the most complete survey available on blowout, cratering and concomitant fire losses on rigs drilling in the 100-mile wide area bordering on the Gulf Coast is that prepared as an aid to underwriting such losses by the Moore-Rutledge Adjustment Co., Houston, through whose courtesy data in Tables I, II, and III are here reproduced.

This company, in a study covering the years 1944 through 1948, surveyed and appraised 658 oil well rotary drilling or workover rigs or pulling units. These rigs were operating, at the time of the survey, in the states of Arkansas, Colorado, Illinois, Kansas, Louisiana, Mississippi, Montana, New Mexico, Oklahoma, Texas, Utah and Wyoming. The total appraised value was $56,977,760 on which was carried total insurance of $38,944,602. The

average value per rig was $86,856.16; average insurance per rig $59,366.77; and percentage of insurance to appraised value 68.35 percent. Subtracting from the over-all total 35 small rigs with an aggregate appraised value of $984,400 and total insurance of $564,350, the remaining 621 rigs reflect an average unit value of $90,166; an average insurance coverage of $61,804; and a consequent ratio on value to insurance of 68.54 percent.

In the same period, surveys were made of losses in which 109 drilling rigs were involved. To set apart the zone in which blowouts form a major hazard, these losses were segregated into those occurring in a zone within a radius of 100 miles from the Gulf of Mexico, and those which were sustained beyond this arbitrarily fixed boundary. It is significant that in the area adjacent to the Gulf, 36 losses, or 50.7 percent, involved blowouts, either alone or in combination with fire or fire and cratering. In the other area, 13 losses, or 34.2 percent, came about through blowouts, either alone or followed by fire. There were no crater losses outside the Gulf Coast zone.

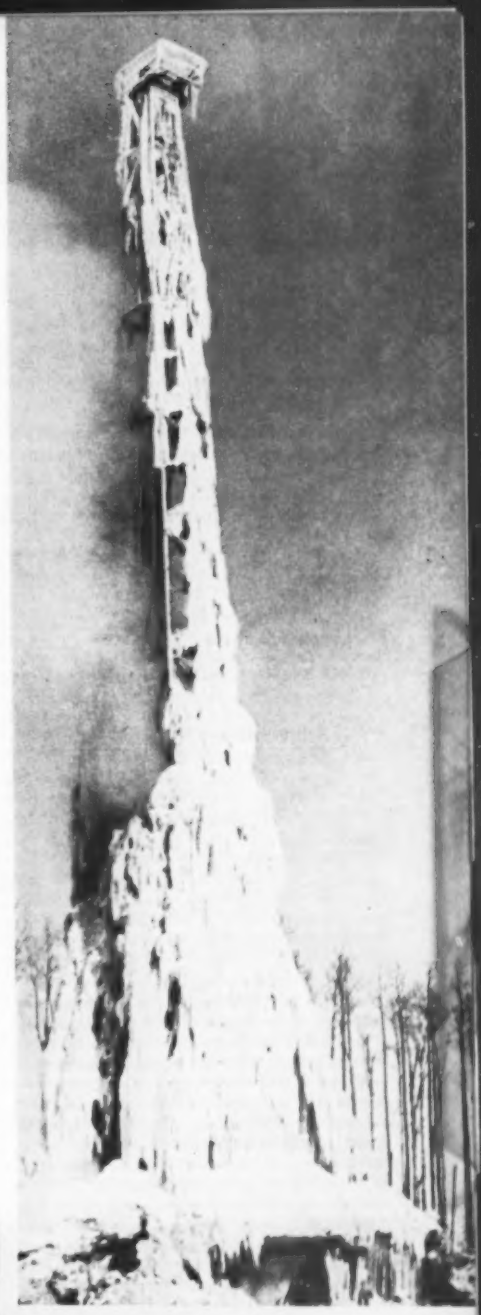
The most serious type of loss, as might have been expected, occurred when the disaster involved blowout, followed by fire and cratering. In three such losses, rigs appraised at $345,274 suffered a 50.49 percent loss, of which 72.11 percent was covered by insurance. Of the five rigs in the coastal zone sustaining loss through blowout and fire, a loss of $190,184 was recorded, while a like number within the inland zone showed a loss total of $208,901. Loss percentages were 30.43 and 39.58, respectively; while corresponding insurance coverage on the losses was 54.63 along the Gulf to 42.51 inland. Improved showing in the so-called "hazardous zone," when cratering does not complicate the picture, reflects in part the greater awareness of drilling crews to the ever-present blowout hazard, as well as more complete protection against down-the-hole disturbances. Likewise, the greater amount of the costs sustained by insurance on such losses indicates the recognition of such hazards by the drilling contractors and their desire to avail themselves of all possible protection.

Where blowouts only, not followed by crater, or fire, are involved, 28 such losses showed in the coastal zone, to aggregate $430,069. The inland figure shows a total of $82,248.72 for eight losses. Of these two, the coastal zone loss averaged 12.54 percent of appraised value, the inland 6 percent. Insurance losses were 74.36 percent coastal and 5.15 inland. It is in this third classification of losses involving blowouts that the true hazard of deep drilling in the Gulf Coast area is emphasized and the need for sharing the costs, either through insurance or internal organization financing, is most imperative.

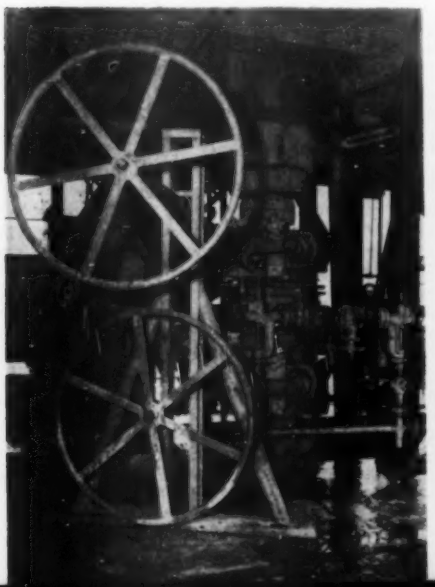
Close correlation of insurance percentages on rig values in the blowout zone with insurance recovered in the three classifications of losses in which blowouts were the primary cause demonstrate how accurately underwriters and drilling contractors had evaluated the hazards involved and had worked out premiums and payments which provided the desired degree of coverage to the contractor while at the same time neither penalizing him with excessive charges nor subjecting the insurance companies to onerous liabilities.

With the decision in the Means case sustained in the higher court and thus appearing to bring within the scope of "blowout" insurance coverage most cases involving drilling misadventure wherein the drill string may become stuck beyond hope of fishing recovery or salvage, two courses of action are available to underwriters and their drilling contractor clients. One, premiums could be increased to the point where the augmented revenue would provide, on an actuarial basis, for anticipated losses of drill pipe and other down-the-hole

Not all blowouts spew out gas and oil. This wild well near the Arctic Circle expelled vast floods of salt water with the gas, the water freezing in the below zero weather to shroud the derrick and form a stack through which the escaping fluid and vapor roared until the well was killed.



Typical hookup of two blowout preventers with choke-controlled vent line tied into the spool separating the preventers. Below the lower preventer, just above the floor line of the cellar, can be seen the master gate for closing off the hole when the drill pipe is withdrawn.



A portable unit, containing pump, storage tanks and control manifold, provides pressure greater than normally available on the derrick floor for closing the blowout preventer rams in the event of a threatened blowout.

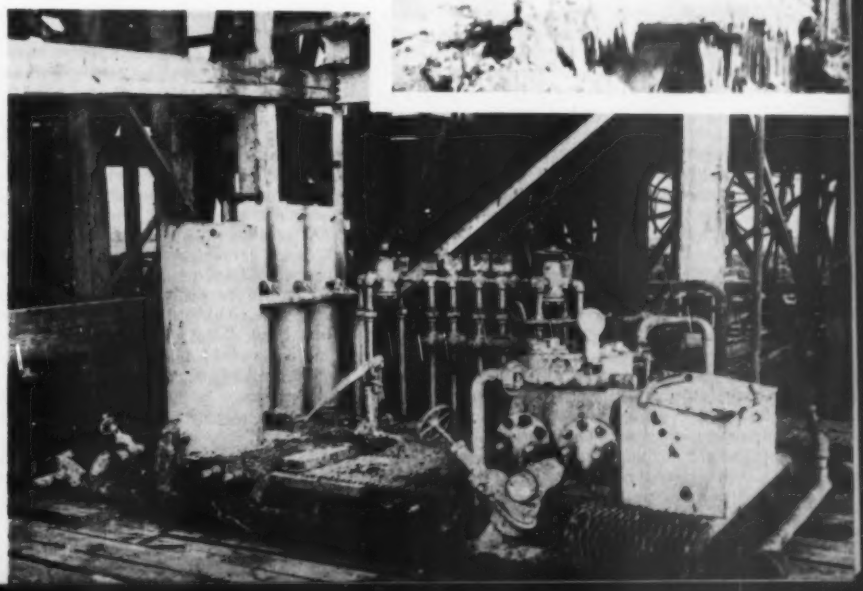


TABLE I

Adjusted Rig Losses Occurring Within 100-Mile Radius of Gulf of Mexico 1944-1948 (both inclusive)

No.	Class	Whole Value	Whole Insurance	Whole Loss	Loss to Insurance	Average Insurance Loss	Percent of Insurance to Value	Percent of Loss to Value	Percent of Insurance Loss to Insurance	Percent of Insurance Loss to Whole Loss
3	Blowout, Fire & Crater	$ 345,274.42	$ 242,500.00	$ 174,349.84	$125,728.05	$41,909.35	70.23	50.49	51.85	72.11
5	Blowout & Fire	625,025.00	367,000.00	190,184.35	103,910.26	20,782.05	58.72	30.43	28.31	54.63
28	Blowout only	3,430,883.02	2,575,666.00	430,069.15	319,779.13	11,420.70	75.05	12.54	12.04	74.36
15	Fire only	1,134,917.88	936,800.00	81,229.68	71,923.28	4,794.88	82.54	7.16	7.68	88.54
20	Windstorm	2,015,004.00	1,840,860.00	139,972.80	119,176.00	5,958.80	91.35	6.95	6.48	85.14
71	Losses, Totals	7,551,104.32	5,962,826.00	1,015,805.82	740,516.72	10,429.81	78.97	13.45	12.42	72.90

Average Insurable Value per Rig involved in loss $106,353.57
Average Insurance per Rig involved in loss ..... $ 83,420.08

TABLE II

Adjusted Rig Losses Occurring Beyond 100-Mile Radius of Gulf of Mexico (Inland Territory) 1944-1948 (both inclusive)

No.	Class	Whole Value	Whole Insurance	Whole Loss	Loss to Insurance	Average Insurance Loss	Percent of Insurance to Value	Percent of Loss to Value	Percent of Insurance Loss to Insurance	Percent of Insurance Loss to Whole Loss
0	Blowout, Fire & Crater	No losses in this classification								
5	Blowout & Fire	$ 527,752.00	$ 422,870.00	$208,901.16	$179,763.32	$35,952.60	80.13	39.58	86.05	42.51
8	Blowout only	1,375,000.00	1,295,000.00	82,248.72	66,633.87	8,529.73	94.18	6.00	81.01	5.15
18	Fire only	2,324,610.00	2,012,385.00	213,119.30	175,716.74	9,762.04	86.56	9.12	82.45	8.73
7	Windstorm	502,258.00	393,345.00	67,832.00	46,490.44	6,641.50	78.31	13.50	68.53	11.82
38	Losses, Totals	4,729,620.00	4,123,600.00	572,101.18	468,604.37	12,331.70	87.02	12.10	81.91	11.36

Average Insurable Value per Rig Involved in loss $124,463.70
Average Insurance per Rig Involved in loss $108,516.00

TABLE III

Recapitulation: Adjusted Rig Losses Coastal and Inland Territory 1944-1948 (both inclusive)

No.	Class	Whole Value	Whole Insurance	Whole Loss	Loss to Insurance	Average Insurance Loss	Percent of Insurance to Value	Percent of Loss to Value	Percent of Insurance Loss to Insurance	Percent of Insurance Loss to Whole Loss
3	Blowout,Fire & Crater	$ 345,274.42	$ 242,500.00	$ 174,349.84	$ 125,728.05	$41,909.35	70.23	50.49	51.85	72.11
10	Blowout & Fire	1,152,777.00	789,870.00	399,085.51	283,673.58	28,367.36	68.52	34.62	35.91	71.08
36	Blowout only	4,805,883.02	3,870,666.00	512,317.87	386,413.00	10,733.69	80.54	10.66	9.98	75.40
33	Fire only	3,459,527.88	2,949,185.00	294,348.98	247,640.02	7,504.24	85.24	8.51	8.39	84.14
27	Windstorm	2,517,262.00	2,234,205.00	207,804.80	165,666.44	6,135.79	88.75	8.25	7.41	79.72
109	Losses, Totals	12,280,724.32	10,086,426.00	1,587,807.00	1,209,121.09	11,092.85	82.13	12.92	12.00	76.15

Average Insurable Value each Rig involved in loss $112,184.15
Average Insurance each Rig involved in loss ..... $ 92,536.00
Average Whole Loss each Rig ..... $ 14,567.04
Average Loss Covered by Insurance each Rig ..... $ 11,092.85

equipment just as it had in the past been computed to protect against the major percentage of loss sustained through blowout damage to the surface equipment. Or, two, underwriters could so revise their policies as to exclude claims for stuck- and lost-drill pipe, bits and collars; eliminating the blowout completely from consideration and limiting liability to resulting fire or cratering. This latter course, by imposing the entire burden of a drill string loss through blowout on the contractor involved, would bring about a steeply augmented per foot drilling cost in hazardous areas; or, as an alternative, might result in financial ruin to a contractor who, unsafeguarded by price increase, might lose an entire rig through blowout and fire or cratering.

An objection to raising insurance rates through the first named alternative is that such a procedure could make it easy for the contractor to collect from his insurance policy for nearly every stuck string of drill pipe which was abandoned down-the-hole, for a down-the-hole "kick," like the laborer's "back injury," is difficult to recognize and equally hard to disprove after the event.

In an endeavor to provide economical insurance without in effect underwriting such losses as are incurred through drilling crew carelessness or ineptness, a number of changes in the standard property floater form have been suggested by various underwriters and adjusters experienced in meeting Gulf Coast (blowout) drilling hazard conditions. One such tentative form includes three paragraphs written to define and limit losses and liabilities insofar as blowouts are a recognized contributing cause. They are:

"Blowout and Cratering Clause: For the purpose of this insurance (a) the term 'blowout' shall be defined as pressure from gas, oil, water or air originating within the well as some depth below the surface sufficient in force as to exceed the applied control effect of the column of drilling fluid (mud) within the well and as a direct result such pressure gets completely beyond control; (b) the term 'crater' shall be defined as a basin-like opening in the earth's surface surrounding the well caused by the erosive and eruptive action of gas, oil, water or air flowing without restriction.

"Blowout Preventer and Master Gate Warranty: In consideration of the rate at which this policy is written, the assured warrants and agrees that the following provisions will be complied with: (a) upon the setting of casing, a standard 'blowout preventer' with pipe rams will be installed and remain in place until the completion of drilling and/or workover operations; (b) a standard 'master gate' with blank (blind) rams will be installed and maintained in accordance with requirements of clause (a) above. (A blowout preventer with blank (blind) rams will be accepted as complying with this clause.)

"Salvage Expense Clause: (Applicable only to drill stem below surface) It is agreed that should drill stem below the surface become stuck as the direct result of an insured peril, the liability of this company for salvage expense (excluding all mud and cement expense) shall be limited to that proportion of such expense actually expended by the assured that the value of all drill stem below the surface bears to the value of assured's interest in the well at the attained depth plus the value of said drill stem. In no event shall the company's liability under this clause exceed the value of drill pipe below the surface at the time loss occurs."

For purposes of protection, both to the drilling contractor and to the insurance company (as well as to the oil industry as a whole as affected by costs of drilling a well), it is necessary that a blowout be defined in simple, uncontrovertible terms, as to what it is, where it is, and when it occurs. Until such a definition is attained and mutually accepted by the contractor and his insurer, blowout protection of drilling equipment may be inadequate and loosely drawn, or rigidly circumscribed and unnecessarily expensive, depending upon which contracting party to the insurance agreement possesses the greater business acumen and experience background. For it appears that, even with an industry agreed upon an understanding of such a natural phenomenon as a blowout, interpretation of such an understanding is subject to the ruling of a court where the terms peculiar to the drilling industry may be as mystifying as are the phrasings of such a judiciary to the drilling contractor.

Need for Big Refinery Expansion Stressed

By Joseph B. Huttlinger

WITH the transfer of the Iranian oil controversy to the Council of the United Nations and the prospect that restoration of Iran's oil to international trade, at least in anything like its former volume, will be long delayed, the effect upon the petroleum situation of the United States is leading to some revision of the views of Washington officials. The question of crude supply to offset the cutting off of Persian crude has been disposed of, at least for the remainder of 1951, by the increase in production in other parts of the Middle East, in South America, and by diversion to Europe of shipments originally intended for American destinations. Provision of refined products, however, which at present requires the export of 190,000 barrels daily from the United States, if maintained over a prolonged period, will necessitate an increase in refining capacity above the million barrels daily formerly estimated as needed to satisfy the rising volume of domestic civilian and military requirements.

The opinion that a rapid enlargement of refining capacity is one of the most urgent needs of the entire defense program is shared by Secretary Chapman and officials of PAD and by members of Congress who have studied the situation. As the Secretary expressed it, the steady rise in military requirements plus the shutdown of Abadan has made it evident that the three-year million-barrel expansion earlier planned will not provide sufficient spare capacity to meet all future emergency demands. Addition of another half million barrels to the expansion of daily refining capacity and an effort to complete the original plan in two years instead of three is reported to represent PAD's present thinking.

The attitude of the military is reflected by the statement of Rear Admiral B. B. Biggs, who is soon to retire from his post as executive secretary of the Munitions Board Petroleum Committee, that it would be fine if the additional capacity could be supplied at once but that, since this is not possible, the thing to do is to "build as much as we can as fast as we can."

The petroleum industry is joining wholeheartedly in the movement. While the target set by PAD in its earlier proposal was the addition of 350,000 barrels of daily capacity in each of the three years 1951-53, plans announced by various oil companies already have raised projected construction to 500,000 barrels yearly. A notable addition to the list was the announcement early in October by Gulf Oil Corporation that, as part of the billion dollar expansion of its facilities now under way, it would add 75 percent to the throughput capacity of its Philadelphia refinery, bringing it up to 183,000 b/d and making it the largest on the East Coast. Included in the new installations will be a crude topping unit handling 125,000 barrels per day and a catalytic cracker of 63,000 barrel capacity, setting a new world record for size.

This is typical of the vast expansion plans which have been made known by oil companies in all parts of the country and on which billions of dollars will be spent in the next few years to meet the goal defined by C. E. Davis, director of the refining division of PAD. In a recent address Mr. Davis said: "The continuing threat of war and the minimum requirements to meet that contingency, which is the basis of our whole mobilization program, make it essential that refining expansion be accelerated to the fullest extent. The key to this acceleration is controlled materials, without which there is no hope of achievement."

PAD has been helping industry plans by making recommendations for accelerated amortization of projects for the manufacture of products designed especially for military use or contributing directly to the defense program. More than 200 such projects, involving an investment of more than a billion dollars and providing substantial additions to the output of aviation alkylate, benzene, toluene and aromatic base stocks, had been studied and approved before the receipt of further applications was suspended early in the summer. The suspension, however, does not mean the ending of this form of cooperation and PAD has continued its studies of proposals with a view to further recommendations when conditions governing materials supply warrant them.

Emphasis on the urgent necessity of increased refining capacity does not mean that the situation as to production and transportation can be viewed with complacency. Secretary Chapman pointed out in his address at Lamar College in Texas a few weeks ago that the country's reserve margin of production had fallen from a million barrels per day in the middle of 1950 to "about half" that figure at the present. He explained that this was not due to lack of effort on the part of the oil industry, but was to be attributed entirely to materials shortages which prevented the industry from expanding its physical plant fast enough to keep pace with rising demands for its products. He gave credit to the industry for increasing the tempo of drilling activity and said that more wells would have been drilled if sufficient materials had been available. The Petroleum Administration had found it necessary to raise the goal for the year's drilling from 43,400 to 43,900 and believed that it would be met, but this still was insufficient to assure national security in a possible emergency.

The Secretary touched also upon transportation deficiencies, pointing out that 300,000 barrels per day of producible crude was locked up in West Texas and another 100,000 barrels in the Rocky Mountain area for lack of pipe line connections. The Petroleum Administration had received applications for pipe line construction requiring 1,500,000 tons of steel, but had been able to allocate no more than 600,000 tons to this purpose.

In spite of the vital importance of petroleum, the Secretary said, the oil industry since the first quarter of 1951 had had to get along with only three quarters of the amount of steel it used before the Korean invasion.

All plans for expansion in oil industry operations, as in all other parts of the national preparedness program, come back finally to the question of steel supply. Mobilization Administrator Wilson has been emphasizing over and over the need for greater steel production, and the steel manufacturers are confident of their ability to set new highs in monthly output during 1952 if sufficient scrap can be provided and if labor interruptions can be avoided. No possible increase in mill output, however, can keep pace with the rapid expansion in armament plans to provide for a doubling of air power, a great increase in naval equipment and other additions to the military program. Reduction of the steel allocation to the oil industry for the first quarter of 1952 to 1,708,000 tons, which is roundly 100,000 tons below the final quarter of 1951 and some 500,000 tons below the amount requested as needed to maintain the current scale of expansion, is disappointing. Still, in view of the accepted dictum that oil is the very foundation of the whole mobilization plan, it is certain that PAD will continue to contend for an adequate supply of metal for its needs and it will have support from various quarters, possibly including Congress, where an investigation of the workings of CMP already has been proposed with special reference to oil industry requirements.

A hearing that has a direct relation to the subject of oil supply was opened by the Tariff Commission during the first week of October. It grew out of a request for reduction of the import tax which now stands at 10.5 cents per barrel on a certain limited quota of crude and 21 cents above that, having been doubled by the expiration of the reciprocal agreement with Mexico at the end of last year. The proposal advocated by a majority of United States importers and by representatives of Mexico and Venezuela, these two countries being the principal sources of imports, was for a reduction to 5.25 cents per barrel. It is violently opposed by the Independent Petroleum Association and by the National Coal Association. The coal men are particularly interested in reducing imports of residual fuel oil which has been gradually displacing coal in manufacturing plants and is the only refined product imported in any substantial quantity. Their objective is to have the duty on residual raised to $1.05 a barrel but they join in opposing any reduction now.

Among the supporters of a lowering of the import tax who appeared at the first hearing were officials of the larger importing companies, jobbers and distributors who argued that the United States needs imports now and will continue to need them, and that no domestic interests will be injured by a reduction of the tax. In fact the claim was advanced that the national interest would not suffer if the duty were removed entirely.

All Weather Microwave Communications

SOMETIME during the last weeks of the European campaign, while Gen. Patton's Third Army was pushing through France and Germany with unprecedented speed, a new system of telephone communication was inaugurated, one which used microwave radio links instead of conventional telephone lines and poles. This system, which was the only means whereby telephone communications could be extended at a speed that equalled the Third Army's advance, was the forerunner of an era that has seen the expanded use of pole-less, line-less telephone circuits for both civilian and military use.

A second milestone in the rapid progress of microwave radio communications was reached on September 4, this year. On that day two history-making events took place. One was the inauguration of a great international convention gathered to sign the Japanese peace treaty. The other was the birth of a new era in television. The telecast of this convention was the first ever to span the 2,600-mile breadth of the United States, flashing from coast to coast across a newly completed string of microwave radio-relay towers. The microwave relay was used, rather than the well known coaxial cable, because its equipment cut the initial cost by half, was more reliable under all weather conditions, cheap to operate, and easy to maintain.

A microwave radio link, as the name implies, relays the telephone conversation (or television picture) through air rather than by wire circuits. The conversation is converted into microwave signals (microwaves are defined later in this article) and are beamed accurately in the desired direction. For long distance conversation a number of repeaters, or relay stations, are necessary to perform functions similar to those of repeaters in telephone lines; that is, they gather in the weak signal, give it a boost of power, and then beam it to the next tower. Repeaters are usually designed to have a 30 to 50-mile separation; however, the distance varies considerably depending to a large degree upon the local terrain.

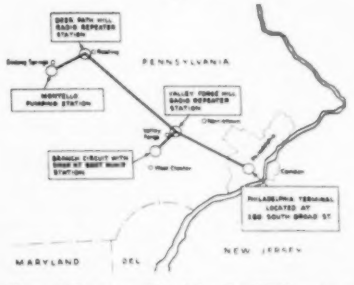
Let us review briefly what microwaves are and why they are used. The air is literally filled with radio signals. Each signal has its own distinguishing characteristic known as a frequency. To prevent one signal from interfering with another, different services must operate on different frequencies. Radio broadcasting operates in one range of frequencies. Television operates on another, FM on a third, mobile on a fourth, and so on for each service. Consequently, a new frequency band is required each time a new application of radio is discovered or when an old service must be expanded.

Generally speaking, new bands are obtained by using higher and higher frequencies. For example, present TV stations operate on what is known as the high frequency, or HF range. To provide additional facilities in areas where the HF range has been exhausted, the Federal Communications Commission (FCC) is now considering allocation of frequency bands for TV in a higher range known as the ultra-high-frequency (UHF).

Microwaves, at the present time, constitute the highest frequency range used for radio purposes. Microwaves are defined as those frequencies above 1,000,000,000 cycles per second, or 1,000 megacycles per second. While lower frequency ranges are over-crowded, providing spectrum for AM, FM, TV, mobile radio, short wave and so on, there is considerable space available in the microwave region. Services using microwaves are not crowded together. As a result it is possible to simplify equipment design and operation because a freer use of frequency spectrum is allowed. At lower frequencies very strict FCC regulations are imposed to make sure that services do not interfere with one another.

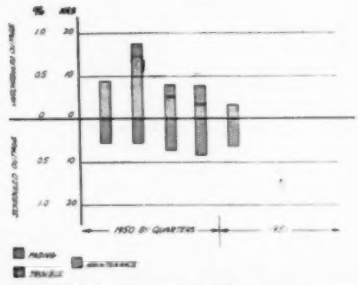
In addition to its availability, there are other reasons for using microwaves. At microwave frequencies it is possible to use simple, small size antennas to "beam" the radio waves in much the same way that an automobile headlight beams light. In other words, instead of scattering the energy in all directions, the microwave antenna concentrates it in the desired direction. The result is a much higher degree of radiation efficiency. For example, a 1-watt transmitter using typical microwave antennas provides the equivalent service of a 1,000,000-watt transmitter which radiates energy in all directions. Because a small amount of power is necessary, the day-by-day operating cost, as well as initial man-

Fig. 1.



Map of Keystone Pipe Line Co. PTM system.

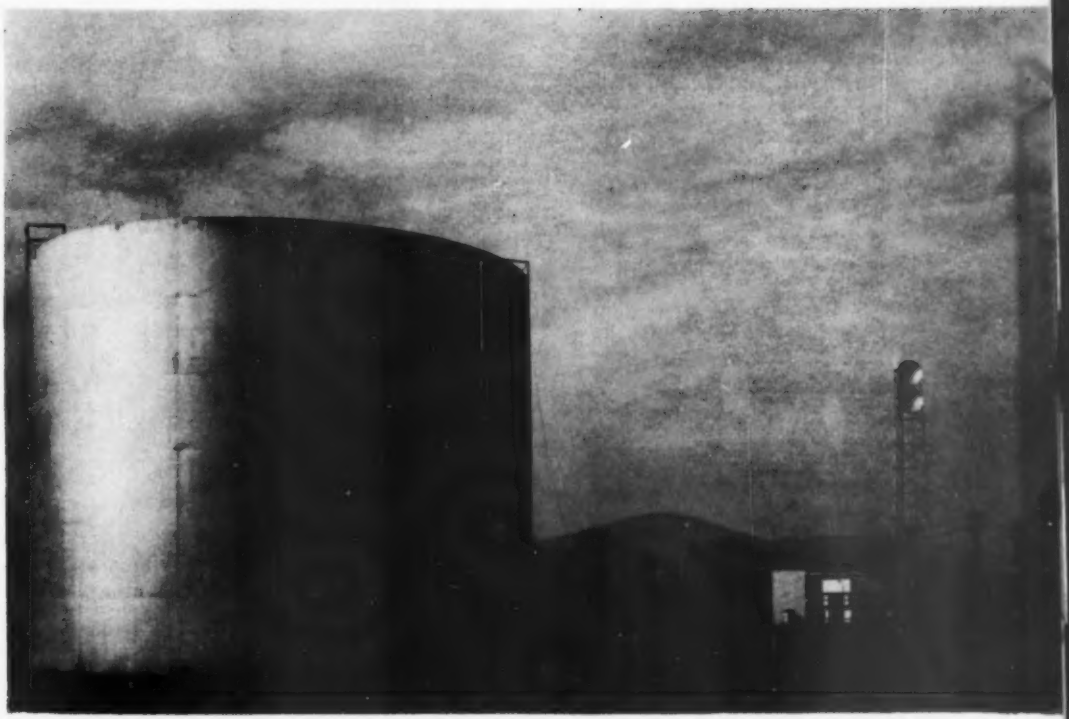
Fig. 2.



Scheduled and unscheduled outage time.

For Pipe Lines

By Joseph Racker*



Microwave terminal at Montello pumping station, Sinking Springs, Pa. Photo courtesy Federal Telephone and Radio Corp.

Back view of typical repeater equipment involving three transmitters, three receivers, two duplexers, automatic switching and fault location. Photo courtesy General Electric Co.

*Microwave Link Consultant, Joseph Racker Co.

ufacture and installation cost, is greatly reduced.

Microwaves are similar to light waves in that they are limited to "line of sight" distances. Thus, while lower frequency signals may be received many hundreds of miles away from the intended reception point, microwaves are rarely received at any point other than within the communication link area. Furthermore, noise such as caused by lightning, spark plugs, and other static producing devices becomes less and less powerful as the frequency increases. This noise has a much greater effect in broadcast frequencies than it does at the higher TV frequencies. Its effect at microwave frequencies is zero, for all practical purposes. Hence, use of microwave frequencies cuts down the two main causes of interference; mainly, other radio signals and natural and man-made noises.

Finally, an important advantage of microwave for radio communication is that its propagation characteristics during climatic conditions that create storms, ice, sleet and fog are usually excellent. Hence microwave communications are most dependable during periods when they are most urgently needed.

Pipe line companies were quick to realize the advantages of microwave radio links. The first independent commercial microwave link installation in the United States was made by the Keystone Pipe Line Co. between its central office at Philadelphia and a pumping station at Sinking Springs, Pa. The installation was completed in November 1949 and has been in 24-hour a day operation ever since, riding through a number of severe storms when all other communication was disrupted.

In October, 1950, the first pipe line microwave link extending over 1,000 miles was installed by the Mid-Valley Pipe Line Co. of St. Louis, jointly owned by Standard Oil Co. of Ohio and the Sun Oil Co. As a result of the successful operation of these microwave links, many other installations have been started. A partial list of some of these installations includes:

Company	Route Miles
Keystone Pipe Line	71
Michigan-Wisconsin Pipe Line	1,500
Texas-Eastern Transmission Corp.	1,400
Trunkline Gas	1,000
Mid-Valley Pipe Line	1,000
Texas Gas Transmission	43
Pan American Pipe Line	110
Shell Pipe Line	160
Panhandle Eastern Pipe Line	350
Texas Illinois Natural Gas Pipe Line	1,000
Transcontinental Gas Pipe Line	Texas to N. J.
Union Sulphur and Oil	Texas to Louisiana

The major feature of microwave radio is its all-weather reliability. With no hanging wires to blow down in sleet and wind storms and few pieces of equipment which can wear out, this new method of communication has solved an age-old problem that has confronted pipe line companies. For, when wire lines were used, the same meteorological conditions that resulted in a disruption of pumping station operations similarly affected wire lines. Hence, just when communications were most urgently needed, they had been most susceptible to failure.

In every installation cited previously, microwave radio was completely unaffected by storm, ice, rain, fog, snow or magnetic storm. In several instances the radio link, as it is also called, continued to provide reliable, uninterrupted communication during periods when all wire lines were out of service for a week or two. Actual records of outage time taken over a year under continuous 24-hour-a-day operation showed a reduction of outage over previously used wire lines of better than three to one. Furthermore, the rare failures that did occur took place mainly between 11 P.M. and 4 A.M., or scheduled periods, when the lines were lightly loaded.

Microwave terminal used for Mid-Valley Pipe Line Co. 1,000-mile communication link. Photo courtesy Motorola.

Other advantages of radio links include lower initial and operating costs; rapid installation with few "right of land" problems; ready expansion of facilities, enabling, in some equipment, as many as 23 simultaneous conversations over one link; and extension of mobile communication over the full pipe line system.

How microwave radio has been used to meet the needs of pipe line companies can best be illustrated by considering two typical installations: namely, the Keystone Pipe Line Co. link and the Mid-Valley Pipe Line Co. link.

The Keystone Pipe Line Co., a subsidiary of the Atlantic Refining Co., was the first pipe line to use a microwave radio-link system for communications. This link serves the pipe line and pumping stations between Philadelphia and Sinking Springs, Pa. As seen in Fig. 1, the link provides traffic circuit between the central office of Atlantic at Philadelphia, the Boot pumping station near Exton, and the Montello pumping station at Sinking Springs. At Montello, the system ties in with an existing wire line extending to both Pittsburgh and Buffalo, the two terminals of the pipe line.

The link was installed in November 1949 and has been in continuous 24-hour operation since. It has provided reliable communication during this entire perod and when a "hurricane" hit Pennsylvania late in November 1950, the microwave system alone rode through the storm without trouble. Similarly, during several ice storms which disrupted wire lines for weeks, the microwave went on without faltering.

Figure 2 is a graph of the outage time of this link as recorded in 1950. The overall scheduled and unscheduled outage time was 0.78 percent. This is remarkably low in view of the following five factors: (1) Of the 0.78 percent, almost half represents scheduled maintenance periods. (2) The outage time included the time required to locate a technician, and the time required for the technician to reach the site, which could be as much as 60 miles away. (3) A large proportion of the unscheduled outage occurred between 11 p.m. and 4 a.m. when circuits are lightly loaded; during this time the microwaves are subject to a phenomenon known as fading. (4) There was a certain "get acquainted" period; with the experience gained during this year, it is felt that the outage will be further reduced, based upon greater familiarity with equipment and improved maintenance techniques. (5) No standby equipment is used in the Keystone link; standby units would, of course, reduce outage time even further.

Because of these results, Keystone officials

have expressed complete satisfaction with the microwave link and have stated that its performance has exceeded both their requirements and expectations.

The Mid-Valley Pipe Line Co., jointly owned by Standard Oil Co. of Ohio and Sun Oil Co., has installed the microwave relay network shown in Fig. 3. The system follows and protects the company's new 1,000-mile crude line from Longview, Texas to Lima, Ohio. With this communication link, Mid-Valley officials can maintain virtually uninterruptible contact with all operations along the pipe line, including any and all vehicles equipped with mobile radio.

A feature of this installation is the inclusion of standby or emergency units at each repeater point. Sensing circuits built into the equipment can recognize a failure of any part of the microwave equipment and automatically switch over the standby gear with only a few seconds interruption in communications.

Because of this built-in protection, the 1,000-mile system is maintained by only four men. These men, each assigned to a portion of the link, periodically visit the otherwise unattended repeater points, exchange burned out tubes, make any necessary repairs (in case a failure caused switchover to standby), and keep equipment in good condition.

Mid-Valley's system is so designed that the company can add other electronic circuits at any time. By the addition of these circuits the position of all switches, signals and valves, and the readings of all important meters, can be displayed at any or all dispatch points. The remotely controlled system will be able then to provide for adjustment and operation of any number of these valves, switches, or other unattended devices by activating the proper circuits.

This opens up a whole new realm of future possibilities for expansion of the system. Imagine a 22-inch valve somewhere on the pipe line. A man at a central point miles down the line will be able to look at a meter on his control panel and read the pressure in the pipe at a point near the valve. Between the points there is only an unseen microwave beam as a communications medium. By pressing a button or closing a switch, the valve will slowly close or open as it is directed, for over that unseen beam will have traveled a signal that directs the valve's opening. In the same manner almost any mechanical operation can be carried out.

Across the southern central section of the United States strides this faithful servant for Mid-Valley Pipe Line Co. By using this new agent with its graceful towers lined across the hundreds of miles from Longview to Lima, the company is finding adequate, reliable and continuous communications possible. A major pipe line problem has been solved.

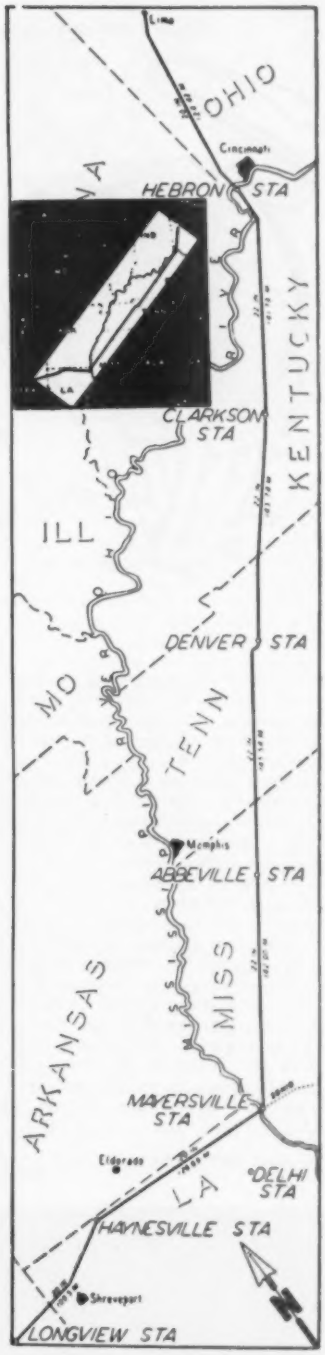


Fig. 3. Map of Mid-Valley pipe line microwave system from Longview, Texas, to Lima, Ohio.

The author tuning microwave transmitter at Keystone pipe line installation. Photo courtesy Federal Telephone and Radio Corp.

CENTERING a large part of its research on products for the farm, Lion Oil Company has developed a wide diversity of herbicides, fertilizers and asphalt products to supplement its fuels and lubricants.

A final step in the mechanization of cotton growing has been accomplished through the development of a differential herbicide which will control weeds and grasses in cotton fields. After several years of research and field testing Lion now is marketing cotton weeding oils on a quantity basis.

In recent years in which the company has made its greatest growth, Lion management has recognized that the prosperity of the company rests on the prosperity of the agricultural south and particularly the prosperity of Arkansas and other nearby states which constitute Lion's retail marketing territory. With this principle established, the company policy has been to direct its research and development primarily into products for the farm.

Similarly much of the company's sales promotion has been of a character calculated to cause farmers to identify Lion as a local enterprise which is trying to help them solve their problems. An example is the "Lion Oil Farm News" a slick paper magazine published bi-monthly for Lion's rural customers. The publication presents a number of feature articles of general interest in each issue plus helpful information for both the farmer and his wife. A feature has been a series of designs for farm homes suited to the southern climate. A page is given over to "current trends and opinion" telling of government actions and attitudes on farm problems. Direct selling is restricted to a single page on the outside back cover although special articles on farm machinery maintenance obviously have a constructive selling purpose.

The company's radio program "Sunday Down South" is tied to home life in the South. Recently Lion has awarded a number of college scholarships to boys and girls who have done outstanding work in secondary schools. Teachers of scholarship winners also were given cash prizes.

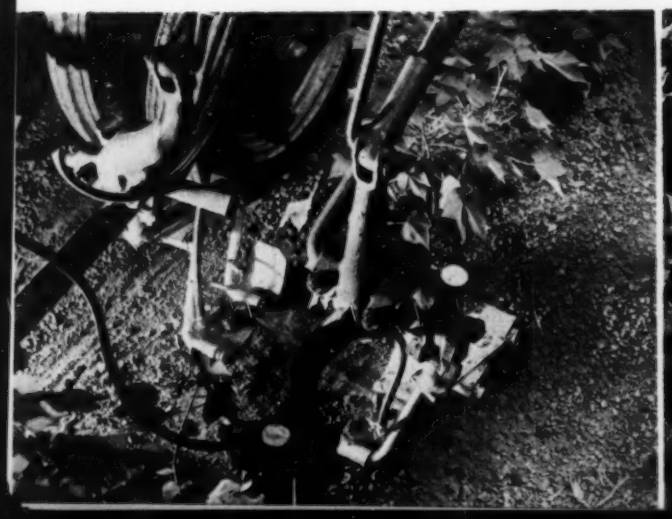
Like many other independent companies which have grown and prospered, Lion Oil Co. came into being originally as the result of a great oil field. It was nearly 30 years ago that the company was formed at El Dorado, Ark. to process crude from the Smackover oil field which was making headlines with its wild wells which came in at pressures too great for control equipment of that day. In the early days of the field individual wells produced from 25,000 to 70,000 barrels daily filling earthen storage when steel tankage proved inadequate. With multiple zones the field produced 69 million barrels in 1925 and still is turning out four million barrels yearly.

The character of Smackover crude has had a good deal to do with the direction which Lion's manufacturing operations have taken. Heavily asphaltic in character, the crude has enabled the company to produce a wide variety of specialties such as under-car coatings, roofing and paving asphalt and paints.

Recently the asphalt research department has developed a specialty which is finding a wide market on irrigated farms. The new product is "Catalytic Pentoxide Air-Blown Asphalt" or more simply "Cat Asphalt." Cat asphalt is produced by adding phosphorous pentoxide during the blowing operation. Result is a highly stable product which resists flowing at high temperatures but remains flexible at low temperatures.

Air blowing of heavy oil residue to produce asphalt has been practiced for more than 50 years but it was not until about 1930 that research revealed that the addition of certain salts such as ferric chloride would both speed up the blowing process and produce asphalts of less brittleness. Most compounds tested, however, had disadvantages. For example, they were difficult to handle in plant processing and produced an asphalt which hardened upon subsequent heating. More recently Lion's asphalt research department conducted experiments with a wide variety of both organic and inorganic compounds which might possibly direct the course of the air-blowing reactions. The most desirable catalysts found were phosphorous pentoxide and phosphorous sulfides, described in U.S. Patent 2,450,756.

At left, spray pattern obtained by tractor-mounted equipment designed to control weeds and grasses in cotton rows. Right, close examination of cotton field reveals effectiveness of spraying rows with herbicidal oils to control weeds.



Use of such easy to handle catalysts was found to be advantageous in controlling both the hardness and the nature of blown asphalts.

At a given softening point a catalytic product can be prepared which is softer at low temperatures than the straight blown asphalt; or at a given penetration the softening point can be increased by catalysis. Thus, instead of blowing light residua to obtain products low in temperature susceptibility, heavier residua with higher flash point and less tendency to exude oils can be air-blown with help of catalysts to the same softening point and penetration relation. The catalytic asphalts form tougher films and are more adhesive. This is in contrast to the grease-like structure of light residue gels.

Blown asphalts produced with the addition of the pentoxide catalyst have high stabilities on heating, and weathering tests have shown that films of asphalts blown from heavier bases with pentoxide weather longer than non-catalytic films of the same penetration and softening point blown from a lighter base from the same crude. Such advantage in weathering of the pentoxide asphalts is important in preparation of bases for compounds to be exposed outdoors.

With certain residua, catalysts have permitted production of roofing products which otherwise would have been too brittle. Asphalts of 70/90 penetration and 180/200 softening point produced with pentoxide have shown considerable advantages over the normal type joint filler in higher resistance to flow in summer, high adhesiveness, and less brittleness at winter temperatures. The pentoxide asphalts have shown long life when used as bases for tank paints. The relatively small change in consistency with temperatures, and the high stability of pentoxide asphalts make them well suited as bases for specialty coatings, saturants for caulking cords, tapes, and so forth.

Earliest agricultural application was in the prevention of water loss from ponds and irrigation canals in permeable soil areas. Orignally the hot "cat" asphalt was sprayed as a membrane on the earth and subsequently buried. More recently it also has been applied to kraft paper at the factory. The coated paper may be rolled and shipped to point of use where it is easily and cheaply applied. Lion has licensed a number of manufacturers who are supplying the asphalt for hot application or for coating the paper. The paper-backed, pre-fabricated membrane is for sale at a cost of about 35 cents per square yard f.o.b. factory. Installed costs on some large projects have been about 75 cents per yard compared with up to $5.50 per square yard for some other types of linings.

Results of Blowing Arkansas Residua with P_2O_5 Catalyst

Asphalt No.	1	2	3	4	5
Float at 122°F. sec.	35	115	125 penetration	55	35
P_2O_5 Catalyst, %	0	1.2	2.5	2.0	2.0
Softening Point (R&B) °F.	175	185	178	199	290
Penetration @ 77°F., mm/10	50	54	53	211	100
Penetration @ 32°F., mm/10	32	33	23	132	83
Penetration @ 115°F., mm/10	82	106	122	——	110
Ductility @ 77°F., cm.	2.0	5.7	14	3.7	——
Flash, C.O.C., °F.	475	600	650+	475	475
Stain Tendency	Severe	Medium	None	Severe	Severe
Increase in Penetration Over Straight Blown, %	——	100	195	514	455

Lion asphalt engineers foresee a bright future for prefabricated linings with mass production and distribution. Such distribution is possible because the rolls may be stored indefinitely without changing their characteristics. They think that in stock ponds, swimming pools and other dam construction the coated paper will be buried in the structure as an all-time cure for seepage and undercutting. It is being considered for use in road and airport runway construction to prevent water damage to subgrades. The "cat" asphalt is usable for drinking water reservoirs since it does not impart a taste to the liquid. Newest form of the prefab material is a reinforced type with imbedded glass fiber or aluminum foil.

Another newcomer to the list of Lion asphaltic products is a recently announced pipe enamel which has been pre-tested on a number of gas and oil lines. It is a light weight blend which contains asphaltic resins, hydrocarbon waxes and a finely divided filler. Among the unusual features of the new prod uct is a flash point above 570°F, which provides a wide, safe range of application temperatures during all seasons of the year. The enamel also is highly resistant to kettle coking, eliminating the need for frequent cleaning of equipment. Once the enamel has "set", it forms a film which is both firm enough and tough enough to withstand the normal handling of pipe while it is being laid. At the same time, the film is sufficiently flexible to provide proper insurance against the cracks which usually develop in coatings as temperature changes cause the expansion and contraction of the pipe. The coating has a very low moisture absorption rate and a high resistivity to long-line currents. When applied on the pipe line, it provides a lasting insulative barrier against all forces of deterioration.

New techniques in the restoration with asphalt of badly broken concrete highways have added substantially to Lion's business recently. The El Dorado plant now is shipping about 5,000 cars per year of asphalt. To repair crumbling highways hot asphalt is pumped under the old slab to fill subgrade holes and voids. Subsequently the road is resurfaced. The entire project costs less than a third as much as an entire new road and maintenance costs are reduced spectacularly. While the road is being resurfaced it may be widened to today's standards.

In addition to the mastic type asphalt for metal surface coverings such as automotive undercoatings, Lion has been manufacturing a line of rust preventatives for about a year under the brand name "Nokorode." These include the oil type with rust inhibitors, the grease or wax type and the solvent type. As a supplement to the $250,000 protective coatings plant built a year ago, a 1,500-barrel naphtha rerun unit was installed to provide special cuts for the coatings and for herbicidal oils.

Lion researchers began their work of herbicidal development with the recognition that the weed problem in the south is funda-

Spray machine travels at fifteen miles per hour to control weeds and grass on railroad right-of-way with herbicidal oils which will have no ill effect on adjacent crops.

mentaliy different from that in the north. In the southern states most of the crops are of the broad-leafed type which means that care must be used in the use of agents of the sort which are effective elsewhere. Tests have shown that herbicides of the hormone type have damaged broad leaf crops at astonishing distances from the point of application. Damage upwind as well as on the windward side has been noted.

Lion herbicides depend for their toxicity on controlled naphthene and aromatic content. Most satisfactory formulas have been developed by extended research at farm experiment stations. Latest formula to be developed is one for economical vegetation control on railroad right-of-way. Railroads are currently using large quantities of this new oil without damage to adjacent farm crops.

Lion's cotton herbicidal, if properly applied, will kill young grass seedlings and also will kill many of the seedlings of the commonly occurring weeds of the broadleaf type without any significant effect on, or permanent damage to the cotton plants. This differential herbicidal action is made possible by the fact that adequate coverage of young weed and grass seedlings can be obtained when the oil is applied at the rate of five gallons per acre and by the fact that undamaged, healthy cotton plants can tolerate this dosage. The oil is applied to each row by two specially designed spray applicators which are attached to the tractor and spray laterally into the row in such a manner that the oil spray effectively covers a zone eight to ten inches wide which includes the drill region of the row. The tractor cultivates the remaining portion of the row and thus controls the weeds and grass on the shoulders and in the middles by the tillage of the soil.

The most complete control of weeds and grass is obtained when they are in the tender seedling stage and before they are over one inch to one and a half inches tall. Each application of oil should be made soon after the weed and grass seedlings have emerged. If they are not controlled at this stage they can be expected to become tougher and more resistant to the action of the oil. In practice, it has been found that as few as three applications per season, when properly timed and applied, can give a satisfactory type of weed control for cotton. No more than five applications should be required any season.

Lion's proportionate investment in petrochemicals is said to exceed that of any other oil company. It owns and operates an ammonia plant of 570 tons daily capacity at El Dorado. Other facilities include a sulfuric acid plant, nitric acid plants, an ammonium nitrate plant, a nitrogen solutions plant, and a sulfate of ammonia plant. Total plant investment is approximately $20 million. The primary raw material is natural gas.

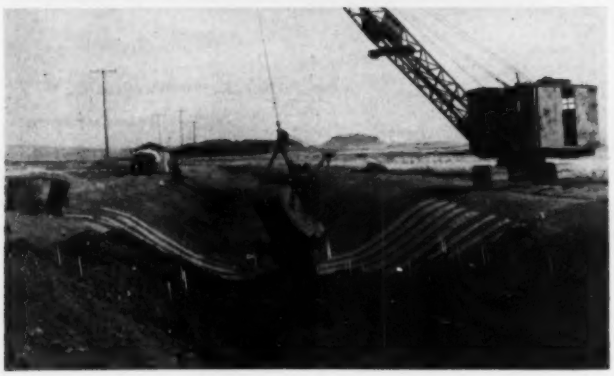
Originally known as Ozark Ordnance Works, this plant was constructed by the U. S. Government. It was designed to produce anhydrous ammonia for wartime uses. Lion operated the installation for the Army Ordnance Department from May, 1943 until May, 1946. The company took over the plant for private operation on a leased basis. In

1

A crumbling rigid-slab pavement requiring constant and expensive attention to keep it in shape for traffic. This photograph and those on Page 93 are reproduced through the courtesy of the Asphalt Institute.

Unrolling strips of prefabricated catalytic asphalt membrane on the slope of an irrigation canal. This photograph and those below supplied by Federal Bureau of Reclamation.

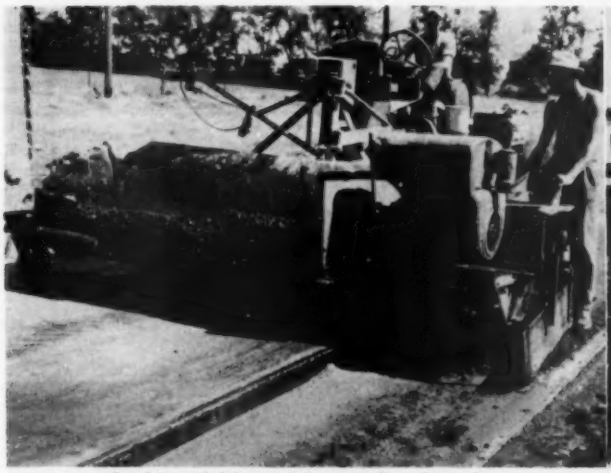
Lap area between strips of "cat" asphalt membrane is sealed to prevent loss of water by applying a small quantity of asphalt cement.



A drag-line places 12 to 18 inches of top soil over the irrigation canal lining. Weight of the cover helps to seal joints in the lining.

2 First step in rehabilitation is pumping hot asphalt beneath old slab to fill subgrade voids.

3 Most old slab roads are too narrow for modern traffic conditions so trenchers excavate shoulders.



4 Special asphaltic concrete spreaders have been developed to pave widened shoulders of older roads.

5 Narrow-wheel rollers have been built to compact the new asphaltic concrete shoulders.

6 The old narrow slab and the new shoulders are resurfaced and rolled to a smooth continuous surface.

7 When opened to traffic the new highway provides a durable road which is less costly to maintain.

Col. T. H. Barton, who has been chairman of Lion since 1947 and previously served as president for 16 years.

T. M. Martin, president of Lion since 1947 was a jobber until he joined the company in 1929 as vice president in charge of sales.

March 1948 Lion purchased it outright. Since then $10 million has been spent for improvements and additions which have increased capacities and diversified output.

The basic product of the plant is anhydrous ammonia of which about one-fourth is sold as such. The remainder is used for the manufacture of other materials. There are three principal steps in the ammonia manufacturing process; gas reforming, purification and synthesis. A portion of the ammonia goes to the nitric acid plants for manufacture into nitric acid. There are two of these plants of slightly different design and size and with slightly different operating conditions. Total capacity of the two plants is approximately 500 tons per day. The nitric acid is an intermediate product used in the manufacture of other materials. The acid is neutralized with ammonia to form ammonium nitrate solution of approximately 83 percent strength.

At one plant this solution is fortified with additional quantities of ammonia to make nitrogen solutions used by fertilizer manufacturers as a nitrogen source in the making of mixed fertilizers. Part of the 83 percent ammonium nitrate solution is concentrated under vacuum to approximately 96 percent solution which is then solidified in the form of spherical pellets coated with conditioning clay and bagged as ammonium nitrate fertilizer.

The plant produces its own sulfuric acid which is neutralized with ammonia to produce sulfate of ammonia which is dried, coated with conditioning clay and used both for direct application and for making high-analysis mixed fertilizers. Capacity of Lion's plant is approximately 380 tons daily of crystalline product.

Since the fertilizer business is highly seasonal, Lion has recently installed six new 1,500-ton Hortonspheres for anhydrous ammonia storage. For nitrate solution storage the company has installed four new 3,000-ton tanks. Total investment in new storage is approximately $960,000.

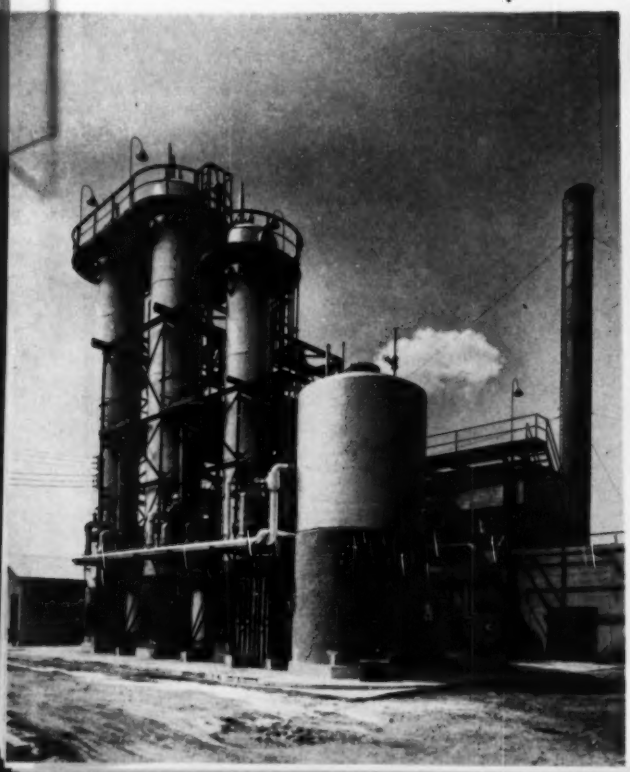
As a result of the current sulfur shortage Lion has decided to build a sulfur recovery plant which will produce about ten tons per day of elemental sulfur. Sour gas now being treated for fuel at a plant near Magnolia, Ark., will be the source of the sulfur.

From its early days the Lion refinery has kept pace with modern processing standards. It was one of the early independents to install thermal cracking facilities, building a large battery of Burton stills when that process was made available for licensing. Today the plant has a throughput capacity of 22,000 barrels daily. It includes a 6,000-barrel catalytic cracking unit. The refinery is a complete plant producing some 60 basic and specialty products.

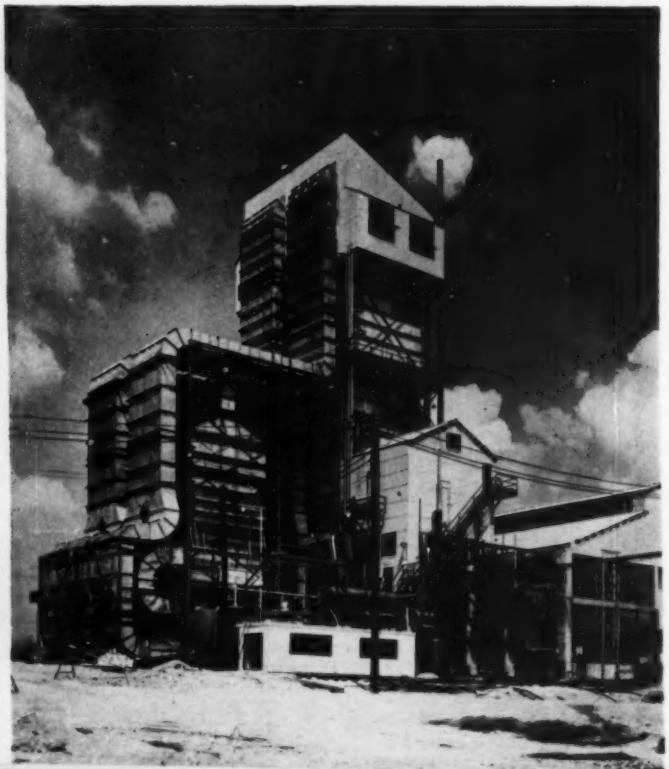
Lion's gross crude production is now about in balance with its crude runs. Its biggest discovery came in 1949 in the Diamond M field of Scurry County, Texas, where the company had 5,600 acres under lease. This discovery doubled the Lion reserves. The old Smackover properties operated by Lion contain very large reserves of oil which will be recovered as secondary recovery techniques are improved.

Under the aggressive leadership of Col. T. H. Barton as chairman, and T. M. Martin as president, Lion has grown in 29 years from a small independent operation to one of the largest industrial enterprises in Arkansas doing an $85 million annual business.

Rerun unit recently installed at Lion's El Dorado refinery to produce a variety of naphthas used in herbicides and naphtha specialties.

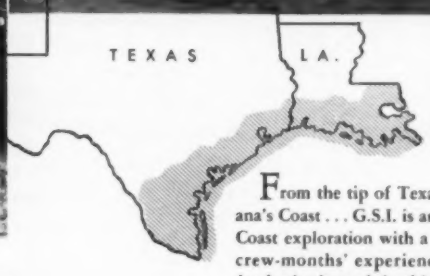


Ammonium nitrate pelleting unit in Lion's $20 million fertilizer plant.



Tractor Drilling

Portable Surveys



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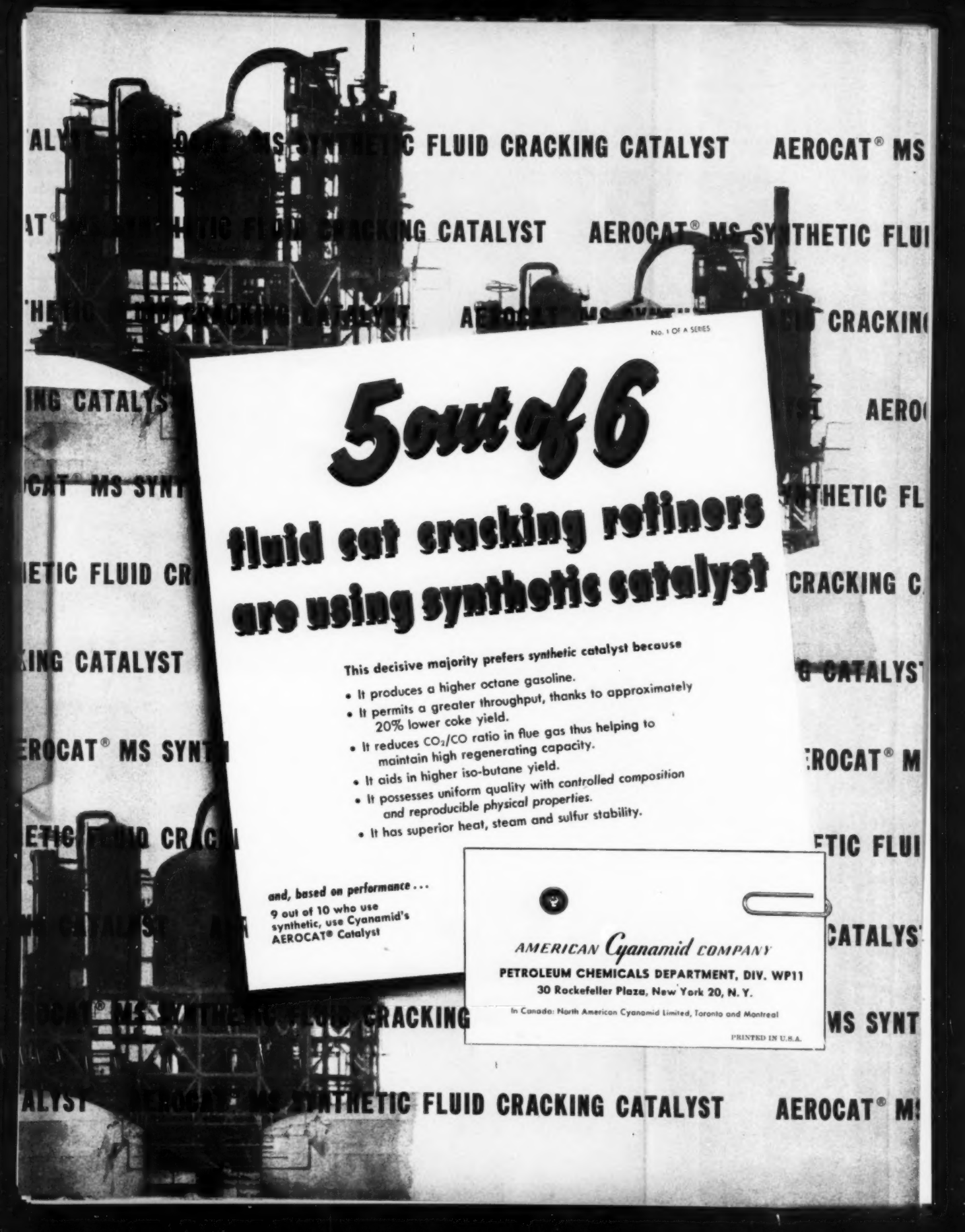
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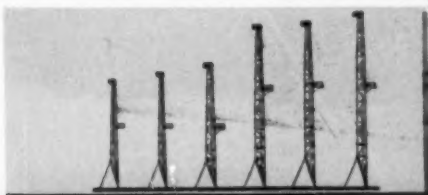
The rear legs of the mast are hinged to allow clearance for the largest drawworks.



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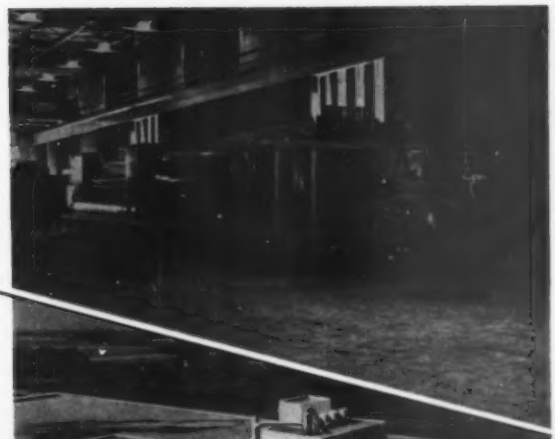

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New Ingredient for Avgas

Announcement of a new additive for aviation gasoline developed by the research laboratories of Shell Oil Company was made recently by James H. Doolittle, vice president of the company. The new ingredient is said to virtually eliminate spark plug fouling in planes by changing the nature of the deposit on plugs so that it does not become conductive. It thereby prevents short circuiting, contributes to safer and more efficient operation and avoids the grounding of planes for unscheduled spark plug replacements.

First Benzene Shipment

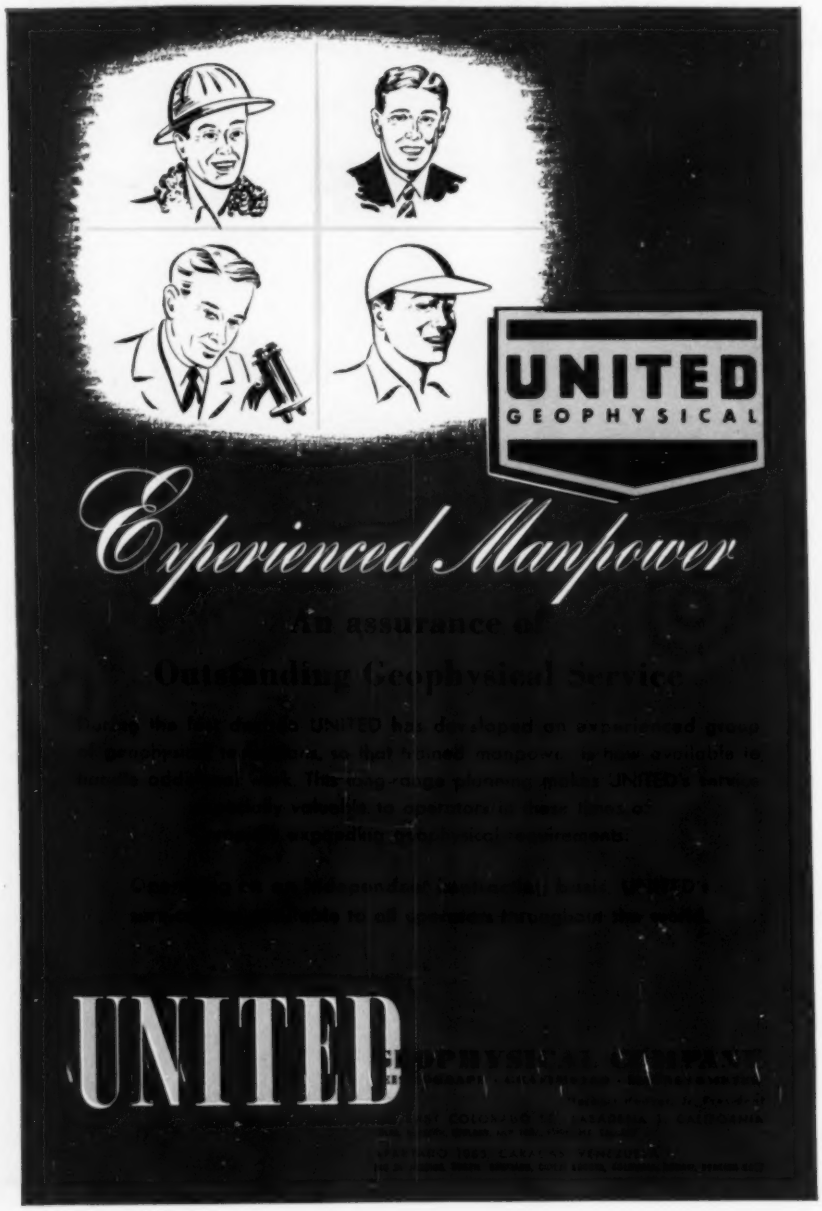
Standard Oil Co. (Ind.) has started commercial shipment of benzene produced from petroleum in the new benzene plant at Whiting, Ind. The present Whiting plant will produce about 11 million gallons of benzene per year. Expansion, scheduled for completion in the second half of 1952, will increase the capacity to 16 million gallons per year.

Consolidates Operations

American Cyanamid Co. has consolidated its several office and warehouse locations in Los Angeles, Calif., into one newly-constructed building at 2300 S. Eastern Ave. The move is the fourth of its kind undertaken by the company as part of a nation-wide program calling for similar consolidations in other major cities of the United States and Canada. The program is designed to improve sales and distribution services to customers and to lower administrative costs by bringing under one staff, under one roof, the various functions performed at numerous locations in those cities.

Builds Sulfur Plant

Standard Oil Co. (Ind.) has begun construction at its Whiting, Ind., refinery of a plant to produce 55 tons per day of elemental sulfur. The Fluor Corp. Ltd. of Los Angeles, Calif. will build the new plant. Completion is scheduled for the middle of 1952.



Esso Plans for Emergency

Esso Standard Oil Co. will purchase a 50-acre site in New Jersey for possible use as emergency headquarters if township authorities agree. The property, part of an Episcopalian convent owned by the Community of St. John Baptist, is located about seven miles west of Morristown and 35 miles from the center of New York City. It is planned to alter the four buildings for general administrative offices and living accommodations for such personnel of the companies as may be required to direct operations of the companies in the event of an emergency. Microfilm copies of records are being made.

The company is also making plans for establishing 12 or more reporting centers in and around New York for use by more than 4,000 employees of the companies concerned. These employees, according to the preparedness program, would report to the stations nearest their homes in the event of an emergency making the New York offices unusable or preventing transportation from home to office, and would receive further instructions through these stations.

R. F. Baity

R. F. Baity, 53, vice president in charge of sales of Standard Oil Co. (Ind.), died of a heart attack October 1. Mr. Baity joined Standard in 1920 as a service station attendant at Indianapolis. His aptness at sales won him quick advancement. He was appointed assistant general manager of sales in 1941. He was elected a director and general manager of sales in 1947 and a vice president in 1949. He was the first former service station attendant to become the company's top sales executive and a member of its board.

Paul M. Isbill

Paul M. Isbill, 56, assistant general manager (administration) of The Texas Company's domestic sales department, died October 10 in New York Hospital after a brief illness. Mr. Isbill served as a pilot in the Army Air Forces in World War I and was employed by The Texas Co. in March, 1920, in the Dallas office. In 1937 he became assistant manager of the northern territory and was promoted to the post of assistant general manager (administration) in 1949.

John Evon Nelson

John Evon Nelson, formerly a director and an executive vice president of the Gulf Oil Corp. and long-time Pittsburgh resident, died suddenly Oct. 6 in his 73rd year. Mr. Nelson joined Gulf in 1908 as secretary to W. L. Mellon and assistant treasurer. He was elected treasurer of Gulf in 1922, and vice president and treasurer in 1939. In August, 1941, he became executive vice president, a position he held until his retirement on June 26, 1949.

Neville Yorke Knox

Neville Yorke Knox, senior vice president of Shell Oil of Canada, died of a heart attack October 5 at a B. C. cattle ranch at Douglas Lake. He was 52. Mr. Knox joined the company in England 25 years ago. He had been in charge of the firm's west coast operations since 1945. He had held many important posts in the United States and eastern and western Canada.

J. C. Bruce

J. C. Bruce, district superintendent for the British-American Oil Producing Co. at Oklahoma City, died Sept. 25 at Oklahoma City of a heart attack. Mr. Bruce came to Oklahoma in 1910 as a pipeliner for the Gulf Oil Corp. He joined B-A in 1935 as superintendent during the early development of the North Mansion area at Oklahoma City.

John P. Roberts

John P. Roberts, 43, assistant general manager of The Timken Roller Bearing Co., service sales division, was killed in an automobile accident near Spruce Pine, N. C. on September 19.

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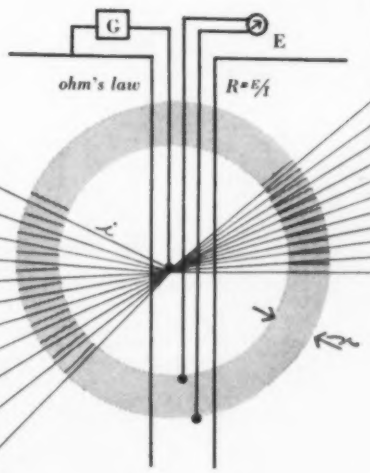

Three Electrode Resistivity

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Two Electrode Resistivity

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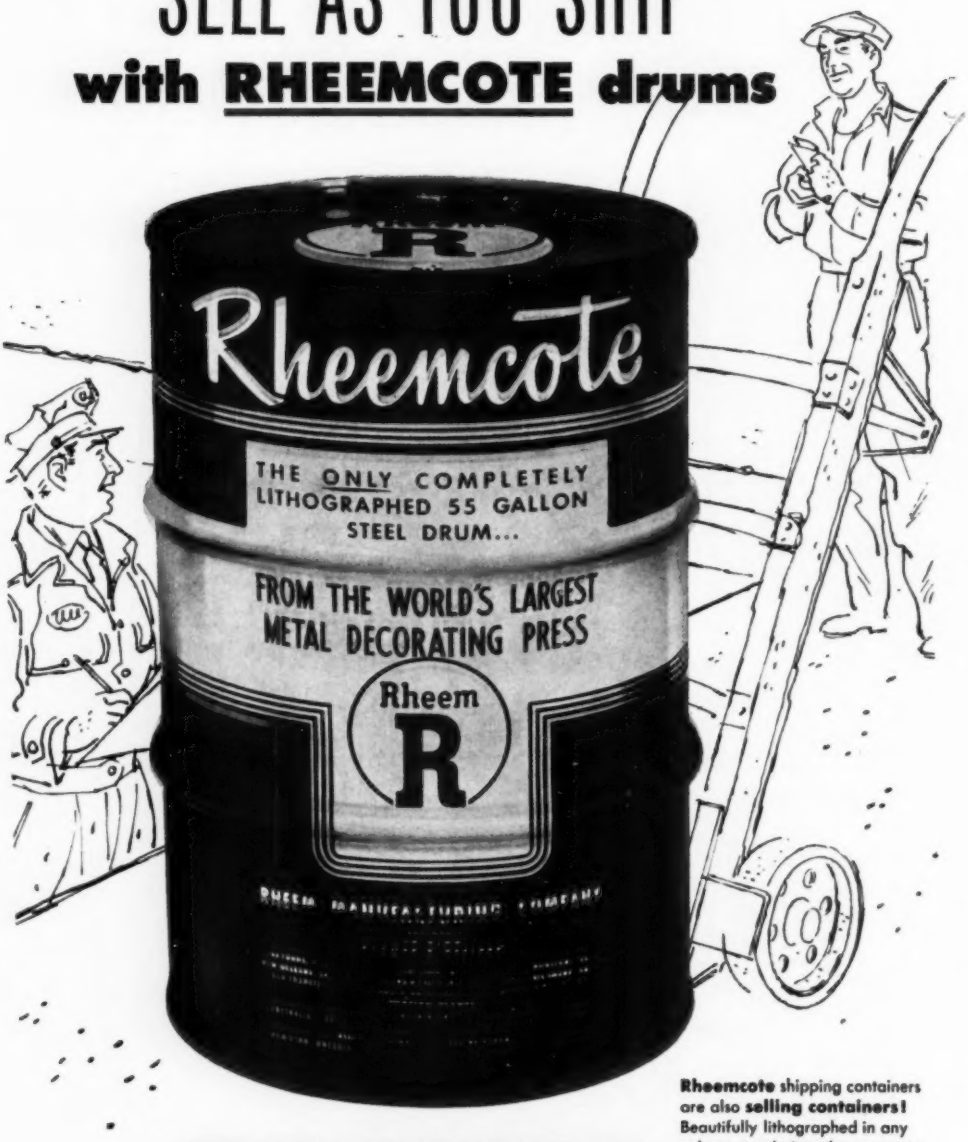

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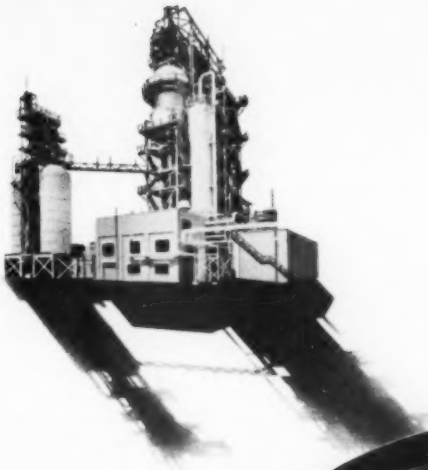

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Imperial Oil Limited placed its first order for process equipment with Kellogg back in 1938. This initial order was for a combination topping and thermal cracking unit. In succeeding years, Kellogg-engineered delayed coking, thermal reforming and alkylation units followed.

In 1948 Imperial put Canada's first Fluid catalytic cracker on stream at Montreal...a unit engineered and constructed by Kellogg. In June of this year, another Fluid unit was completed by Canadian Kellogg at Imperial's Winnipeg refinery.

Today, Canada's largest catalytic cracking unit—a 25,000 BPD Fluid unit—is going up at Sarnia, Ontario. Canadian Kellogg is engineering and constructing this cracker as well as a new two-stage distillation unit with a capacity of 50,000 BPD... also Canada's largest.

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for fifty years an integral part of processing history

NEW YORK JERSEY CITY LOS ANGELES TULSA HOUSTON TORONTO LONDON PARIS

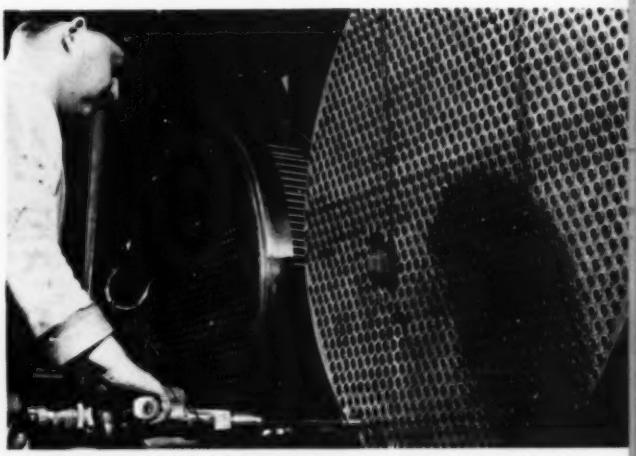
Portrait at

This year is Kellogg's fiftieth of service to industry. At this time naturally, as a group of men—known collectively to the modern business world as The M. W. Kellogg Company—we can think back nostalgically. We can remember the chimney stacks

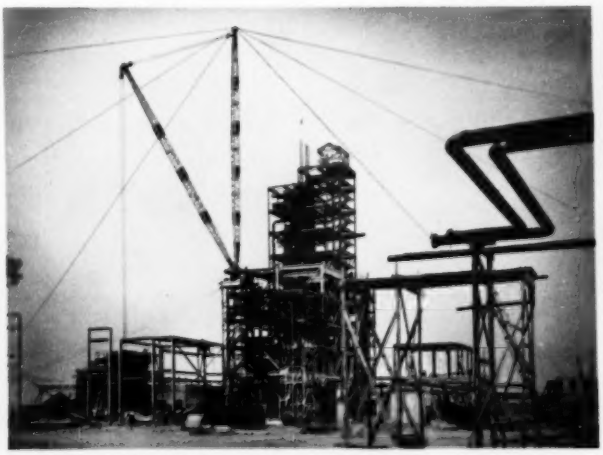
"Construction's battle with time!"

In previous issues of this magazine, "camera portraits" of M. W. Kellogg today have highlighted major aspects of Kellogg's research, development, engineering, procurement and fabricating activities.

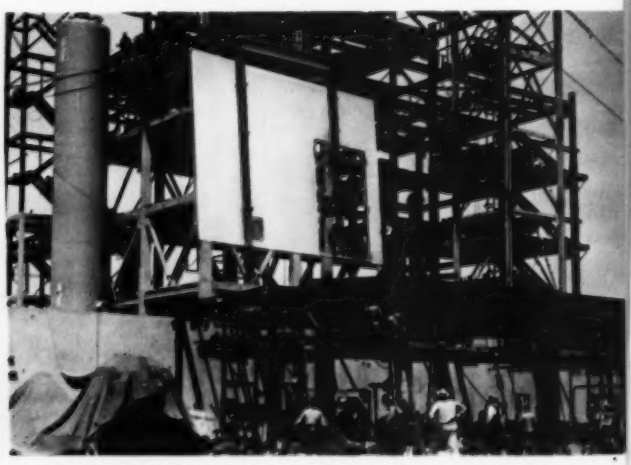
This month, the camera picks up the tour on the floor of the Heat Exchanger Shops in Jersey City. From there it swings to the construction lot, focussing on some of the techniques Kellogg utilizes in its continuing "battle with time."



1. *HEAT EXCHANGER FABRICATION*, in essence a combination of piping and vessel fabrication, is another major activity in the shops. Here in the assembly section of the Exchanger Shops, the most modern type of electronic-control roll-in equipment is used. Kellogg heat exchangers in service run the gamut of size . . . from 6-inch outside diameters to 13 foot diameter shells containing 8,000 tubes.



4. *NOW TAKEN FOR GRANTED* in major plant construction, the towering guy derrick was first introduced in the field by Kellogg construction engineers. The cumulative industry-wide savings—both in time and money—resulting from this one construction innovation are illustrative of the results achieved by constant efforts to improve methods and equipment.



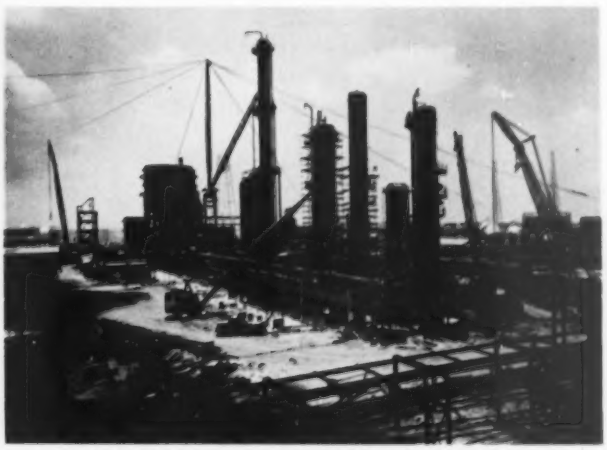
5. *PERMANENCY OF THE KEY STAFF* which plans and directs construction activities . . . and close day-to-day integration with the design engineering staff are responsible for the company's improved methods in the field. The adoption of the "pre-fab" assembly line on the refinery site (that's a whole pre-fab wall in the air) is one of the unusual techniques pioneered by Kellogg construction crews.

Fifty... no. 10

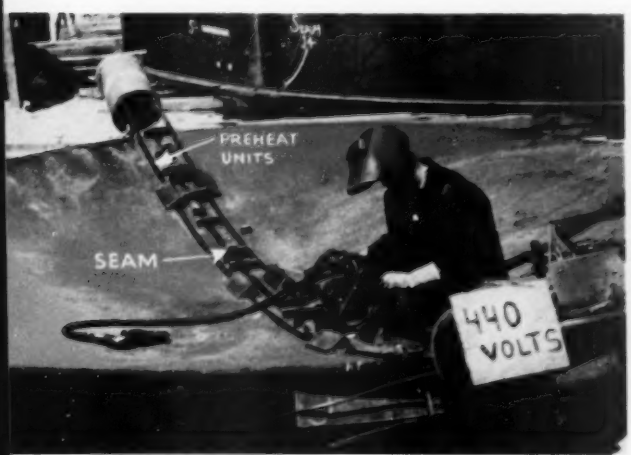
KELLOGG
1901-1951
50th Anniversary

we built in 1901 . . . the first crude vessels for oil refiners in the 'teens . . . our first combination unit . . . the forty-odd Fluid cat crackers built in these years. But, after all, The M. W. Kellogg Company is only a factor as it is able to serve industry today. For that reason, we are presenting this series of monthly camera studies which document our belief that a truly integrated organization can better serve industry to achieve greater earning power. This is No.10 in the series.

2. *TYPICAL OF THE ASSORTMENT* of exchangers that might be found on the Shop floor on any given day . . . these units represent applications varying from pressures of 5,000 pounds per square inch at temperatures of 1100°F. to high vacuum service at below freezing temperatures of the order of liquid oxygen. Final destination . . . a job site.



3. *ON THE JOB SITE* the same principles employed in engineering and fabrication—detailed planning, efficient tools (created if necessary), constantly modernized techniques, experienced supervision—all pay off in reduced costs and shortened construction periods. The company's permanent construction staff is large . . . can handle as many as forty major construction projects at one time.



6. *ANOTHER RESULT* of close integration in the Kellogg organization is that the precise quality methods used in plant practice are quickly adopted for field use. This is true particularly of welding practices—such as induction pre-heating shown here—which are continually improved as more and more is learned about the behavior of metals.

7. *IN SOME INSTANCES* in field construction, it pays to do most of the pipe bending in the field, and Kellogg's job site, pipe bending set-ups are virtual miniatures of the company's extensive shop operation—from equipment to methods. Piping up to 36 inch diameter has been successfully and economically bent in the field.

NEXT MONTH

. . . in the eleventh and final edition of this series of "camera studies" of M. W. Kellogg today . . . the camera finishes its tour of the construction lot and focusses on the overall picture of Kellogg's service to industry.

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M. W. KELLOGG

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The M. W. Kellogg Company *(A Subsidiary of Pullman Incorporated)* **New York, Jersey City, Los Angeles, Tulsa, Houston, Toronto, London, Paris**

A view of the catalytic cracker. From left to right, the 196-foot furnace stack, catalyst hoppers, and top, catalyst conveyor. In front is the compressor house.

Catalytic Cracker Installation Completes Shell's Pernis Expansion

Close-up of the cracker. White rectangular structure at front is the regenerator with lift. To the right is the fractionating column.

COMPLETING a $56 million program of expansion at its Pernis refinery near Rotterdam, Holland, the Royal Dutch-Shell Group recently opened the first modern catalytic cracking unit to be placed in operation on the continent. The completed refinery has a daily crude capacity of approximately 98,000 barrels.

The refinery has three distillation units with a present throughput of about 86,000 barrels per day, and two high-vacuum installations, one of which is for processing asphaltic residues into asphalt while the other distills waxy distillates from wax residues. The waxy distillates are dewaxed in a solvent dewaxing plant, a part of these distillates then being purified with sulfuric acid and clay in a dry refining plant. The refined lubricating oils are mainly shipped in packaged form, a filling plant having recently been put into service for this purpose.

The slack wax obtained during the dewaxing process is cracked in two vapor-phase cracking units. From the cracked distillate obtained in this way, a fraction is separated off by fractional distillation. This fraction is rich in olefins and forms an excellent base material for the manufacture of detergents.

The asphalt works include blowing plants for the manufacture of fully-blown and semi-blown asphalts, plants for the manufacture of cut-back asphalts, and asphalt emulsions. There is also a large filling plant for packing the various asphalt products.

For the manufacture of gasoline from residual base materials, there is a Dubbs thermal cracking unit working. Part of this unit is equipped for the selective cracking of paraffin-base materials into gas, gasoline and fuel oil, while asphalt-base materials are processed into gas, gasoline and petroleum coke.

The catalytic cracking plant, which is of the fluid type, is fed from a feed preparator in which long residue is processed into distillates and short residue.

The refinery also contains a thermal reforming plant in which gasoline with a low octane rating is converted into higher quality gasoline. For further processing of the cracked gases, a number of units have been built in which gases are purified and split into valuable components, such as butane and propane. The hydrogen sulfide from these purification plants is converted into sulfur in a Claus kiln installation.

For the purification of thermally cracked gasoline, there is an acid refining and redistillation unit. All gasolines are treated to improve their odor in two doctor treaters. In order to meet the demand for special gasolines for industry, a gasoline redistillation unit is in use. An acid refining plant for kerosine makes it possible to manufacture purified lamp kerosine.

In a tetraethyl lead mixing unit the finished motor gasolines are mixed with the required quantity of TEL.

The waterfront of the refinery, including tank farms, covers three and a half miles. There are 19 jetties for tankers, coasters and tank lighters. Seven tankers, including the modern 28,000-ton super-tankers, can berth at one time. The total discharging capacity is nearly 37,000 barrels per hour. The total area of the refinery site is 900 acres. Storage capacity is 1,200,000 tons.

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Brazil's Council Reports Oil Industry's Progress

By R. G. Walker

THE National Petroleum Council has issued a report on developments in the oil industry during last year. From the introduction to this report the following particulars have been summarized.

Geological and geophysical surveys have revealed the existence of promising structures which will be confirmed by pioneer drilling at Piria, Marituba and Parana de Moreira in the Amazon region; at Palmeira Alta and Barra de San Miguel in Alagoas; and at Guarei in the state of San Paulo.

On structures located prior to 1950, experimental wells drilled in Bahia at Agua Grande (Catu) and Paramirim do Vencimento (Almas) have proved productive and add to the state's oil reserves.

During the year the search for oil was carried out in various other areas. Investigations in the Amazon Basin, extending from Jarajo Island to the Lower and Middle Amazon, included geological surveys of the Tapajos, Trombetas and Erepecura rivers, and geophysical work by seismic and gravimetric methods in the municipalities of Afua and Chaves, and on the rivers Tocantins, Moju, Cunaticu, Piria, Mapua, Cocooes, Jurupucu, Cururu, Madeira and Purus.

Operations in the state of Maranham included a detailed survey of the Carolina-Balsas area and seismographic profiles on the Island of San Luis in San Marcos Bay, and in the Perizes-Presidente Dutra region.

Seismic investigations were begun in Alagoas, in the neighborhood of Maceio, and were completed in Sergipe, in the Center and Northeast. Geological and geophysical research was intensified in Bahia, the former by four teams operating in the Center and South. Seismic surveys were carried on by teams of the United Geophysical Co. and Geophysical Service Inc., who prospected in the areas of Paramirim do Vencimento, Mata de Sao Joao, Catuicara, Dom Joao-Sao Francisco de Conde and Mocambo.

Geological surveys were also made in the sedimentary coastal belt of Espirito Santo, between Victoria and the Bahia frontier; in San Paulo, in the region of Guarei; in Parana, at Jacarezinho and Ribeirao Claro; in Santa Catarina, at Lajes; and in Rio Grande do Sul, at Quarai.

Drilling operations, which had been concentrated in the Reconcavo district of Bahia until 1949, were extended in 1950 to Para and Sergipe, where pioneer wells were opened at Limoeiro and Japaota. At the end of the year drilling had reached a depth of 2,230 meters at Limoeiro and was still proceeding. The Japoata well proved non-productive at 537 meters. At Carolina, in Maranham, where the necessary rig has been mounted, drilling is planned to start this year.

During 1950, 33 wells were completed in the state of Bahia. Of these, four are dry, while 25 yield oil and four gas. One, in the municipality of San Francisco, was opened for stratographic purposes. Of 11 opened in the Candeias field, seven produced oil and three gas. At Dom Joao also, only one of the three completed wells was dry. At Aratu, one existing well was deepened and yielded gas, while the Piranhas pioneer well in the Jeremoaba region proved dry. At the end of 1950 two wells were being drilled at Candeias, and pioneer drillings were proceeding at Pedras, Agua Grande and Paramirim do Vencimento, all three indicating the existence of oil. Eleven rigs were employed on these operations, the total depth amounting to 22,973.38 meters as follows: Candeias, 13,507.51; Dom Joao, 5,891.48; pioneer drillings, 3,574.39 meters.

By the end of the year, 202 wells had been opened in the state of Bahia, namely, Candeias, 75; Dom Joao, 34; Itaparica, 27; Lobato-Joanes, 17; Aratu, 13; Pitanga, 4; pioneers, 13; and stratographic, 19. Of the total, 117 are producing oil and 19 gas, three are exhausted and the remainder are dry.

The Council's report emphasizes the importance of the drilling southeast of Candeias: e.g. C-71, which yielded oil at 1,377 meters and appears to tap a new and lower oil zone. If this is confirmed, the discovery opens encouraging prospects for Bahia petroleum reserves.

The production of crude by the Bahia wells assumed a definite industrial character toward mid-year, when the Mataripe refinery began working. Production increased from 109,077 barrels in 1949 to 338,707 in 1950, and by the end of the year had reached 977,040 barrels, 78 percent being from the Candeias field.

During the final quarter of 1950, when supplies to Mataripe were constant, it became possible to determine the effective yield of the various fields. The collected data showed a potential production of close to 20,000 barrels daily in Bahia.

The production of natural gas reached 5,070,049 cubic meters in 1950, an increase of 2,807,083, which is accounted for by contractual supplies to a factory at Itaparica, and to the use of this fuel in the initial operations of the Mataripe refinery and in various boilers at the Candeias field. The natural gas available in the Bahia fields is estimated at 1,200 million cubic meters.

Available reserves of oil in the Reconcave district were estimated at 44 million barrels at the year's end, taking into consideration the three principal fields (Candeias, Dom Joao and Itaparica) and excluding the new producing areas discovered in 1950. The appreciable increase over the preceding year is due to the results obtained from the most recent drillings in the Dom Joao field.

Investigations begun in 1949, to verify the possibility of exploiting economically the pirobituminous schists of the Paraiba Valley in San Paulo, were continued throughout 1950. Stratographic, structural, topographic and drilling operations were carried out, and samples were collected for analysis, 6,939 samples being obtained from 27 wells for laboratory tests to determine the economic value of the reserves.

Under an agreement concluded in 1950 between the Petroleum Council and the United States Bureau of Mines, the latter will provide technical assistance in all matters relating to the exploitation of bituminous schists. The arrangement will include the services of at least four experts in the mining, distillation and refining of shale oil. A well-known American specialist has inspected the work done to date and gathered data for examination by the Bureau of Mines.

During the year, the Council extended the prospecting of bituminous and piro-bituminous rocks beyond the Paraiba Valley to the municipality of Guarei in San Paulo. The object is to determine the oil reserves in the asphaltic-arenite deposits of the Boctacatu-Anhembi region. Samples were taken for analysis from 13 drillings.

The report points out that Decree No. 28,661 of Sept. 19, 1950 created the "Commission for Industrialization of Bituminous Schists," which is directly subordinate to the President of the Republic through the intermediary of the National Security Council. In accordance with this decree, the Petroleum Council must provide technical supervision and assistance and draw up a plan to further the Commission's work. In December, the area which is being prospected in the Taubate and Tremembe municipalities of the Paraiba Valley was proclaimed a public utility for purposes of disappropriation.

A rationing service was created in December to regulate the national supply of liquid fuels if the necessity should arise owing to the world situation.

The Petroleum Council's activities in the industrial field during 1950 included the completion of the Mataripe refinery in Bahia and the commencement of work on the 45,000 barrel refinery at Cubatao, in San Paulo. The leveling and draining of the area and the construction of buildings and railroads were begun. At the same time, two-thirds of the equipment and nearly all storage tanks, ducts and pumps were acquired abroad. Part of this material has already reached Santos, and the refinery should be ready for operation in 1953.

Referring to the Mataripe refinery, which was erected in the record time of ten months by national engineers assisted by the contracting company's staff, the report states that between October 24 and December 31 the plant processed 144,524 barrels from the Candeias, Itaparica and Dom Joao fields, and produced 41,500 barrels of gasoline, 12,500 of kerosine, 5,100 of diesel oil and 33,000 barrels of fuel oil. When capacity is raised from 2,500 to 5,000 barrels, Dom Joao crude will be chiefly used. In accordance with the contract signed with M. W. Kellogg Co. on December 4, the new unit is to begin working within 15 months. It will include an installation to produce gasoline of high octane

(Please turn to page 134)

Canada Conducts Oil Sands Symposium

Announcement of government policy with respect to development of the Athabaska tar sands of northern Alberta was made by N. E. Tanner, Alberta minister of mines and minerals, at the recent five-day oil sands symposium at the University of Alberta. About 120 oil men attended the meeting and 80 flew to McMurray and Bitumount to visit the government's experimental oil recovery plant.

Mr. Tanner said the Alberta government wishes to encourage the orderly development of the great oil sands deposits of the Athabaska River region. He favors a clear cut policy which should be kept flexible to meet a variety of extraction programs and changing conditions and circumstances. The policy was adopted to encourage immediate development in view of the ever increasing demand for petroleum products and to offset uncertainty as to other world supplies.

Lease terms demand that applicants begin construction of plants of agreed sizes within two years and complete construction and begin to operate within five years of the issuance of leases. From that point on, leaseholders should "diligently" process the oil sands. Areas to be leased would be determined by the capacity of the plants proposed, the intention being to provide each leaseholder with sufficient oil sands to satisfy his plant capacity for a period of at least 30 years.

Royalties for the first 21-year term of any lease will be fixed at 10 percent but subject to governmental review in subsequent renewals. The long fixed royalty term is provided to offer stability for a new enterprise which would involve huge capital expenditures.

A lease does not give the holder the right to drill for oil or gas on the land in the orthodox manner. Only the right to "mine, quarry, work, remove, treat and dispose of the bituminous sands and products" is given.

Prior to actual leasing of areas, each applicant may apply for one prospecting permit covering an area of 50,000 acres of the oil sands area, the fee for each permit being $250. The applicant must deposit $50,000 in cash to guarantee satisfactory performance of the approved exploration program. The permits are for one year and the holders must pay a rental of five cents per share. Permits may be renewed for a second year at a rental of 10 cents per acre, and for a third year at 25 cents per acre, providing all other terms of the permit are met. No permit may be renewed after a three year period has elapsed.

The permit holder may at any time within the three-year period end his prospecting permit. He then has the exclusive right to acquire a lease within the area of such permit. His deposit of $50,000 will be held until his plant is established to the satisfaction of the government. Should he not require a lease, his deposit will be returned if work commitment and other conditions have been met.

The prospecting permit requires the holder to furnish the government with all geological and geophysical information secured in the exploration of his reservation area, along with logs of test holes drilled, and evidence of expenditures incurred in this examination.

Much of the discussion at these conferences centered around details already published in the Blair report.* Chairman for the oil recovery session was Dr. K. A. Clark, Research Council of Alberta, a scientist with years of research experience regarding extraction of oil from the sands. L. E. Djinheuzian, mines branch, Ottawa, dealt with bitumen separation by the cold water process while Dr. S. Pasternack, Research Council of Alberta, discussed the hot water separation process. Both are used in series at the provincial government's Bitumount pilot plant.

Further discussion on such subjects as pilot plant operation, application of fluidized solids techniques, flow characteristics of sand suspensions and other matters in relationship to the general operation of process and ultimate recovery of products were dealt with by experts who had come prepared with papers to be delivered on these different subjects. One discussion of general interest dealt with transportation and pipe line costs which was given by H. H. Hall, Bechtel Corp. General discussion, including reference of Canadian taxes, was led by A. G. Burton, president of the Alberta Institute of Chartered Accountants.

While agreeing that the symposium had been a "most worthwhile conference," some of the visitors felt that the government's policy on development of the world's largest known oil reserve "lacked concessions for the company willing to be the first pioneer." In answer to these criticisms, Mr. Tanner stated that the government of Alberta was prepared to give "some special consideration" to the first commercial plant in operation in the oil sands area, but did not specify what it might be.

* See WORLD PETROLEUM, April, 1951.

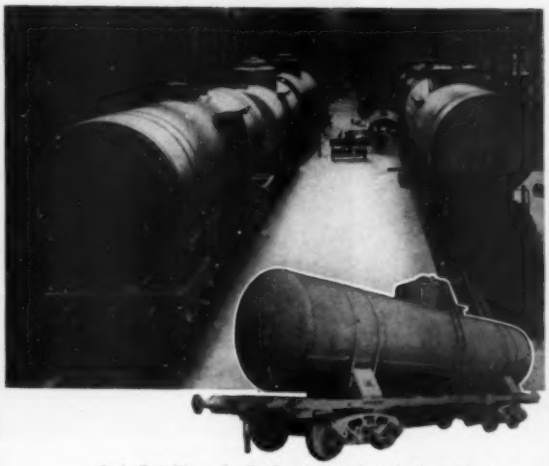
German Refining Grows

Due to entry into operation of the refinery of Ruhrbau GmbH, Mülheim-Ruhr, and a larger throughput by other plants, refinery production in Germany showed a 14 percent increase during the second quarter of the year over the preceding three months. Supplies processed included 890,690 tons of imported crude and 296,462 tons of domestic production plus 31,108 tons of semi-finished products, giving an output of finished products amounting to 1,154,818 tons as compared with 1,014,676 tons in the January-March quarter. Biggest increase, 54 percent, was in diesel oil in which a shortage had been feared earlier in the year. Motor gasoline had an increase of 14 percent, bringing it up to 360,000 tons, which supplies almost the entire domestic demand for this form of fuel.

Soviet Drilling in Austria

The Soviet Mineral Oil Commission is extending drilling operations in Austria in the Enzensdorf and Schwadorf areas east of Vienna and south of the Danube. The announced purpose is to explore horizons deeper than those reached in earlier tests.

What do you require in a tank car?



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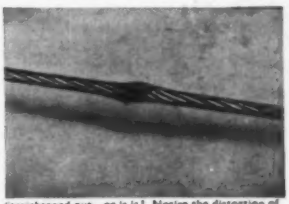
IF ROPE COULD TALK . . .

Let's hope somebody sees this wire rope in time. It only needs 'unkinking' but the offending loop *must* be 'lifted' out by hand. If it is merely pulled tight, the rope may *seem* to straighten itself but closer examination will show serious distortion of the strands — as the illustrations reveal. The application of a load does not remove a kink —it merely distorts the rope and permanently impairs its efficiency.

HOW NOT TO STRAIGHTEN OUT A KINK

The loop is almost removed — by force.



Straightened out—or is it? Notice the distortion of the strands—it spells trouble ahead.

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Oil company staff changes

John H. Gray

JOHN H. GRAY has been named director of public relations for Lion Oil Co. He formerly was with The Wall Street Journal's southwest edition in Dallas, Texas. A native of Newark, N. J., Mr. Gray was graduated from Cornell University, Ithaca, N. Y., in 1940. He was in the army from 1941 to 1946, advancing to the rank of Major and was with the 77th Division in the Pacific Theatre.

HARRY C. CARR, chairman of the First National Bank of Philadelphia, has been elected a director of The Atlantic Refining Co. He fills the vacancy caused by the retirement of E. H. Blum, former vice president of Atlantic in charge of crude oil production.

ARTHUR R. ENKEMEIER has been appointed assistant treasurer of California Texas Oil Co., Ltd. For some time prior to his employment by Caltex he was with the Irving Trust Co. for a period of 18 years from 1923 to 1941.

Arthur R. Enkemeier

DR. R. K. STRATFORD has been appointed scientific advisor to Imperial Oil Ltd. He has been head of Imperial's technical and research division for the past 22 years. In 1924 he joined Imperial as chief research chemist and five years later was appointed head of the technical and research division. Dr. Stratford was awarded a Doctor of Science degree (honoris causa) in 1949 by the University of Western Ontario.

Dr. George Gurd has been appointed manager of Imperial's research department to succeed Dr. R. K. Stratford. He joined the company as a research chemist in 1933. He was appointed assistant research director in 1947. During World War II Dr. Gurd was on loan to the Department of Munitions and Supply as assistant to the director of the chemicals and explosives division. In 1947 he was awarded an M.B.E. for his wartime service.

D. S. SIMMONS, formerly manager of the engineering division at the Sarnia refinery of Imperial Oil Ltd., has been appointed general superintendent at Montreal East refinery. After graduation from Queen's University, Mr. Simmons joined Imperial as a draftsman in the engineering department at Sarnia refinery. In 1943 he was loaned to St. Clair Processing Corp. as technical superintendent and later became assistant manager. In 1946 he returned to Imperial as chairman of the manufacturing technical committee. The following year he was appointed assistant manager of the engineering and development division, and manager last year.

BERNARD GOULSTON has been named chief staff chemist of the research department of Imperial Oil Ltd. at Sarnia, Ont. He joined Imperial in 1923 as a chemist at Montreal East refinery. Three years later he went to Talara, Peru, as chief chemist with International Petroleum Co. Returning to Canada in 1927, he was made chief chemist at Imperial's Ioco refinery in B. C. In 1936 he was transferred to Sarnia refinery. He was appointed assistant manager of the technical service division in 1948.

R. W. DUNLOP has been appointed manager of the engineering division of the manufacturing department of Imperial Oil Ltd. succeeding D. S. Simmons. Mr. Dunlop joined Imperial's manufacturing department at Calgary in 1927. In 1944 he was loaned to St. Clair Processing Corp. as mechanical superintendent, returning to Imperial in 1946 in the engineering and development division and became assistant manager in 1950. C. P. Warkentin and J. J. Rowan succeed him as assistant managers of the division.

WILLIAM D. DAVIS has been named head of the geological department of Stanford Oil Co. He will operate from the company's field office at Evansville, Ind. Mr. Davis was geologist for the Standard Oil Co. of Ohio for many years.

Stanford Oil Co. recently opened a New York office in the Empire State building. The company is a producer in the Illinois-Indiana-Kentucky area. It is headed by Kenneth J. Stanford.

CLARENCE E. BOOZ, JR., has been appointed head of the safety unit of the employee relations department, Gulf Oil Corp. Mr. Booz joined Gulf in 1928 as a pipefitter helper and was subsequently transferred to the safety department. He was appointed safety director of the company's three refineries in Texas in 1940 and served in that capacity until his most recent appointment.

KENNETH D. MACDONALD has been appointed manager of the asphalt sales department of Imperial Oil Ltd. to succeed Frank A. Hogan, retired. Mr. MacDonald joined the company as asphalt sales engineer when the department was formed in 1919. He served with the Canadian Field Artillery during the First World War.

Rawleigh Warner, Jr.

RAWLEIGH WARNER, JR., Houston, assistant to the president of Continental Oil Co., has been elected assistant treasurer of the company. Mr. Warner joined Continental as assistant to the treasurer in 1948. In 1949 he was elected secretary, with headquarters in New York. Early this year he was appointed assistant to the president, with headquarters in Houston.

OSCAR B. LEWIS has been elected vice president of Ethyl Antiknock Ltd., Canadian subsidiary of Ethyl Corp., to succeed William M. Turnley who has retired but remains as a director and consultant. An Ethyl employee for 24 years, Mr. Lewis has been general manager of the Canadian company for the last year. He joined Ethyl Corp. in 1927, and was engaged in promotional work in New York and New England. The introduction of "Ethyl" gasoline in England took him to that country later the same year. He returned to the United States in 1929 and subsequently was engaged in sales and safety work. He was appointed safety manager in 1935 and assistant general sales manager in 1947.

Oscar B. Lewis

L. C. Lamar M. W. Haas

MERRILL W. HAAS has been appointed chief geologist and Lee C. Lamar assistant chief geologist for the Carter Oil Co., it was announced by H. F. Moses, Tulsa, vice president in charge of exploration and research. Mr. Haas has been with Standard Oil Co. (N.J.) and affiliates 17 years and recently has been staff geologist with Carter in Tulsa. He has served as research paleontologist for Humble Oil and Refining Co., chief paleontologist for the Standard Oil Co. of Venezuela and division geologist for Creole Petroleum Corp.

Mr. Lamar began work with Carter in 1932 following graduation from the University of Oklahoma. He was district geologist and land man in Michigan, transferred to Mattoon, Ill., as division geologist and since 1947 has been on Carter's geological staff in Tulsa.

D. B. LAYER of Imperial Oil Ltd. has been appointed division geologist at Calgary. A native of Winnipeg and a graduate of the University of Alberta, Mr. Layer joined Imperial's producing department in 1945. He worked as a geologist on wildcat wells until 1947 when he was appointed to the subsurface department, Calgary. Two years later he transferred to the research department.

A. J. SINGLETON has been elected to a new executive staff position, vice president and director of marketing policy and coordination of California Texas Oil Co. He also will be permanent chairman of the marketing coordination committee and director.

Mr. Singleton, who was a director of the Petroleum Board in England during World War II, has been engaged in the oil business since 1924. A native of Ireland, he started with Galena Signal Oil Co. (of Ireland) Ltd., and subsequently became managing director of the English subsidiary of The Texas Co. At the end of World War II, he was appointed assistant general manager of the foreign sales division, and in 1947, when Caltex acquired the European interests of The Texas Co., he joined Caltex as assistant vice president. Mr. Singleton was born in Dublin, Ireland, and received his education at the Christian Brothers School there.

A. J. Singleton

F. A. Davies B. B. Howard

F. A. DAVIES and **B. B. HOWARD** have been elected directors of the Arabian American Oil Co. it was announced by W. S. S. Rodgers, chairman. Mr. Davies, who is also executive vice president of Aramco, has his headquarters at Dhahran, Saudi Arabia. Mr. Howard replaces John R. Suman, who has resigned from the Aramco board.

E. H. BLUM has retired as vice president and director of The Atlantic Refining Co. and general manager of the company's crude oil production department. Mr. Blum is a native of Philadelphia and has been a resident of Dallas, Texas, for more than 30 years. He joined Atlantic early in 1905 in the blueprinting and filing section, rising to chief draftsman in 1912. He became associated with the producing activities in 1916, and in 1919 moved to Dallas to organize and direct Atlantic's new producing headquarters.

In 1936 he was elected a vice president and was appointed general manager of Atlantic's domestic crude production department, serving in that capacity until 1946 when he was put in charge of all of the company's producing activities, both domestic and foreign. He was elected a director of the company in 1937.

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Roger Gilbert

ROGER GILBERT will become president, effective as of January 1, 1952, of Panhandle Producing & Refining Co. Mr. Gilbert has been a member of the Atlas Corp. organization since 1931 and a vice president during the past 12 years. He has been a director and chairman of the executive committee of Panhandle since the spring of 1947. Mr. Gilbert will succeed John V. Boyce who is resigning both as president and director.

ROBERT B. OGDEN became manager of the foreign shipping department of Socony-Vacuum Oil Co. Inc. on Nov. 1. He succeeded the late L. R. Owen. Mr. Ogden was manager of the operations division of the company's manufacturing department in New York.

DWIGHT F. BENTON has been elected vice president in charge of sales of Standard Oil Co. (Ind.) to succeed R. F. Baity who died Sept. 30. Mr. Benton joined Standard in 1923 as a member of the first sales engineering school at its Whiting, Ind., refinery. In 1939 he became manager of the Rocky Mountain sales division, and in 1946 was promoted to assistant general manager of the lubricating and sales technical service departments at Chicago and in 1947 was advanced to general manager of those departments. He was elected president of Root Petroleum Co. of Shreveport, La., in 1948 and returned to Standard as a director and general manager of sales in 1949 when Pan American Petroleum Corp. of New Orleans, La., a Standard subsidiary, and Root, a Pan American subsidiary, merged to form Pan-Am Southern corporation.

DR. A. LEWIS, JR., has been appointed chief product engineer, motor lubricants and additives section, product development department of the Gulf Oil Corp. He will have the product development responsibility of all motor lubricating oils and greases and additives, and will serve as a consultant on chemicals.

Robert L. Grun has been appointed chief product engineer, industrial lubricants and specialties section, on transfer from industrial products engineering, where he served as chief fuels and lubricants engineer, process oil section. He is succeeded by R. L. Nix.

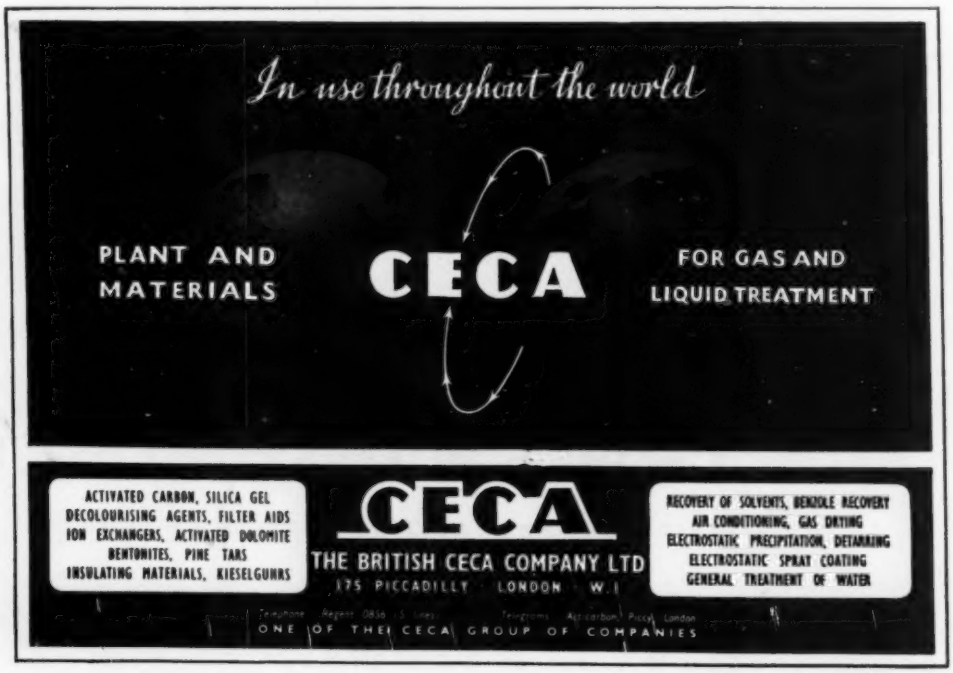
In automotive products engineering, H. H. Donaldson has been transferred from chief fuels and lubricants engineer, equipment section, to chief fuels and lubricants engineer, marine engine section. He is succeeded by R. P. Gilmartin.

F. A. MENKEN has been appointed a vice president of Tide Water Associated Oil Co. and manager of exploration of the company's western division, according to announcement by President William F. Humphrey. Mr. Menken succeeds L. C. Decius who retired after more than 35 years of service with Tide Water Associated. Mr. Menken has been employed by Tide Water Associated since graduating from Stanford University in 1926.

R. J. Munn

R. J. MUNN has been appointed assistant sales manager of oil field products for Rockwell Manufacturing Co. Recently he has been working as a sales engineer of the Nordstrom Valve Division of Rockwell's Houston district office, and before that was in charge of the Corpus Christi office for several years. Prior to joining Rockwell he worked as a roughneck in the oil fields and later was associated with Bethlehem Supply Co.

J. A. AHEARN has been appointed manager of supply and distribution of Sinclair Refining Co. He has been staff assistant to the vice president in charge of marketing, supervising such activities as price control, budgetary control, sales and operating statistics and special studies incident to the company's marketing expansion and development program.



DR. E. L. DEGOLYER has been elected an honorary member of the American Institute of Mining and Metallurgical Engineers. Only 20 men may hold the office of honorary member of the AIME at any one time. In 1909, when he was but 23 years old, Dr. DeGolyer located the famous Potrero del Llano No. 4 in Mexico. This "find" has alone produced in excess of 100 million barrels of oil. In 1919 he organized the Amerada Petroleum Corp. and in 1925 its subsidiary, the Geophysical Research Corp. He served for a number of years as president of the two firms as well as chairman of the former.

Dr. DeGolyer served as chairman of the petroleum division of AIME from 1923 to 1925, as president of the Institute in 1927 and as a director in 1928 and 1929. He has served on various committees of the Institute throughout his membership. He has been a lecturer at Princeton University and the University of Texas and is a member or fellow of a number of scientific organizations in the United States and England.

G. S. WILLIAMSON, assistant manager of Shell Oil Company's Shellburn refinery at Shellburn, British Columbia, has been appointed superintendent of the new $3,000,000 Shell petrochemical plant in Montreal. Mr. Williamson joined Shell in 1936 as a laboratory helper at Shellburn. He has been successively chemist, senior chemist and process supervisor before being made assistant refinery manager last May. He is a graduate in chemical engineering of the University of British Columbia.

MARVIN L. BROWN has been appointed superintendent of production for the Canadian division of Sun Oil Co. with headquarters in Calgary. He formerly was regional superintendent of production for Sun's southwest division at Dallas, Texas. Mr. Brown succeeds George E. Bentley who resigned to accept an administrative post with a newly-organized drilling company. G. E. Dunlap continues as manager of the Canadian division.

James E. Boudreau

JAMES E. BOUDREAU has been appointed director of public relations of Ethyl Corp. He succeeds Ralph C. Champlin, who has resigned to become a vice president of the Pennsylvania Railroad Co. Mr. Boudreau, who served as sales manager in charge of marketing services until his present appointment, has been associated with Ethyl for 21 years in various sales, customer services and advertising capacities. During World War II, he served with the Sixth Service Command and was a lieutenant colonel at the time of his release from duty.

ALBERT GREGERSEN has been named governmental relations advisor in Gulf Oil Corporation's foreign production division in New York to succeed C. A. Baird, retired. The appointment was made by C. W. Hamilton, vice president in charge of foreign production operations. Mr. Gregersen was formerly branch manager for the Danish American Prospecting Co. in Denmark, a Gulf subsidiary.

Augustin Pyre has been appointed branch manager and Carl C. Von Elm general superintendent of the field operations with residence in the field, and will act as American branch manager should Mr. Pyre be absent from Denmark.

B. C. BROOCKS, 29-year Sun Oil Co. veteran who has been superintendent of the Corpus Christi district, has been appointed regional superintendent of production in the southwest. He succeeds Marvin L. Brown, who recently moved to Calgary, Alberta, Canada, as superintendent of production for the company's Canadian division. Robert E. Bates, drilling superintendent in southwest Texas, succeeds Mr. Broocks as district pro-superintendent at Corpus Christi.

J. L. ROGERS, Oklahoma City, has been appointed as central division superintendent for the Carter Oil Co. to succeed H. R. Shannon, who goes to Denver, Colo. as production superintendent for Carter's northwest division. He has been with Carter since 1935, working first in the Seminole fields and then as chemist at the Grisso gasoline plant, Seminole.

DR. W. E. ELWELL has been appointed manager of eastern product development of the Oronite Chemical Co., subsidiary of Standard Oil Co. of Calif. His headquarters will be at 30 Rockefeller Plaza, N. Y. C. He formerly was supervisor of chemical products for California Research Corp. and has worked for Standard Oil of Calif. and subsidiaries for the past 13 years.

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Activity on Canada's West Coast

Reports from British Columbia state that drilling and exploration in the Province continues at a record rate, with 11,882,574 acres already under permit or application.

One of the latest well sites located is in the Lone Mountain area near the Alberta border, where camp buildings are under construction and a drilling rig is en route. In the Flathead district in the southeast section, Pacific Petroleums has established a camp to explore a 67,000 acre permit.

Drilling and geological work is expected to start soon on the west coast of Vancouver Island after federal mines department geologists reported evidence of a basin of oil bearing sands.

Phillips Petroleum, currently drilling a deep test near Fort St. John, will put down another well in the same area. Pacific Petroleums plans to drill its second well farther south in the same area. Pacific Allied nearby has passed the 4,000 foot level in what company officials term the most encouraging structure encountered in the area.

In the meantime, exploration teams are busy in the field. Hudsons Bay and its affiliates have seismic crews surveying locations near the Alberta border, where applications for more than 800,000 acres have been filed within the past few weeks.

Charter Oil Co. has applied for 200,000 acres in the Peace River area, Atlantic Oil seeks 100,000 in the same area and M. E. Manning has applied for 100,000 acres straddling the Alaska Highway.

Colombian Customs Exemption

Empresa Colombiana de Petroleos, newly organized to take over operation of the De Mares concession in Colombia, has been granted exemption from import duties on equipment and products needed from abroad. Operators of the Barco concession have a similar exemption but other foreign companies do not. Under the 1950 tariff, import duties were increased an average of about 400 percent on drilling equipment and up to 2,000 percent on some items.

Klinger Head Visits United States

Charles Soukup, managing director of Richard Klinger, Ltd., arrived in the United States on October 11 for a two months visit. He will be at the Savoy Plaza during his stay in New York. The company is planning to reintroduce Klinger products in United States markets. Offices will be opened soon and production undertaken at a later date. In addition to its line of compressed asbestos fiber jointing, the company manufactures reflex level gauges, the Klingerflow seatless piston valve and the Klinger sleeve packed cock.

Weir on Pyrene Board

Sir Cecil Weir, K.B.E., M.C., has joined the board of directors of The Pyrene Co. Ltd.

Creole Foremen On U.S. Tour

As part of its longstanding program of training as many Venezuelans as possible for a wide variety of positions in that country's highly-developed oil industry, Creole Petroleum Corp. has brought to the United States a group of ten Venezuelan foremen for a two-months' tour through the East and Middle West, where they will see at first hand phases of industrial, social and economic life in the United States.

They will visit mills turning out tubular steel goods they themselves use for drilling wells and laying pipe line in Venezuela, watch equipment manufacturers making drilling bits, pumps and refinery equipment, and tour shipyards where marine craft for their own company are being built. They will see automobile assembly lines, visit coal mines and steel mills, have a look at the stockyards of Chicago, see a typical cattle ranch in Texas, the General Electric plant in Schenectady, and a ball game in New York.

The foremen are Orangel Perozo, Esteban Olivares, Jose Calderas, Rafael Alfonzo, Jose Romero and Antonio Gonzalez of Western Venezuela and Caisar Rodriguez, Jose Nunez Fermin, Braulio Rodriguez, and Luis Rodriguez of Eastern Venezuela. They will be accompanied by a bilingual Creole representative working in Venezuela, Homer Grigry, and a representative from Creole's New York offices, Pedro M. Rincones, who is also bilingual.

Tropical Severance Bonus

Reversion of the De Mares concession in Colombia to the government-owned Empresa Colombiana de Petroleos involved a transfer of field employees from Tropical to the government payroll. Each employee was given a severance bonus equal to one month's pay for every year of service. Total bonus paid was $2,733,420. Salaries of Empresa employees are to be adjusted to compensate for the loss in commissary subsidy, as Tropical was selling supplies to employees at 1944 prices, a policy which the government will not continue.

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P.90.

Venezuela Convention Closes

The first National Petroleum Convention of Venezuela closed on September 18 after an extremely successful ten-day series of meetings. Top government officials appeared on the platform of the Andres Bello High School to hear Foreign Minister Gomez Ruiz deliver the closing remarks. After stressing his government's desire to keep the economy from becoming one-sided as a result of the preponderance of oil, he touched on "the pride which Venezuela feels" in having maintained in its legislation a policy of economic non-discrimination between nationals and foreigners, and pointed to the guarantees Venezuela provides for the foreign investor. He repeated the pledge he made at the recent meeting of foreign ministers of the American republics, that Venezuela is prepared to make again the tremendous contribution to the war effort which it was called upon to make in the early forties, with the hope that the need would not arise again. He concluded with a graceful reference to the pleasure Venezuela had had in entertaining "so many and such distinguished guests."

The guests, comprising oil men from twenty countries and all branches of the industry, for their part seemed to have nothing but praise for the conduct of the convention. Five days of the reading of papers reviewing the history and present status of such diverse phases of the Venezuelan industry as transportation and taxation had given them a broad panorama of the extraordinary producing and exporting phenomenon which is Venezuela. These sessions were followed by an intensive and well-organized three-day tour of the oil fields around Lake Maracaibo, oldest and still the most important producing area of the country. Highlights of this trip included a day spent principally on a chartered ferryboat, inspecting such operations as the driving of concrete foundation piling in one hundred feet of water, the laying of flow lines over water, and drilling from a barge miles from shore. Another day was spent in visiting the Cretaceous limestone fields of Concepcion, Mara and La Paz. Much interest was shown in the Christmas tree and the several flow lines of Shell's La Paz P-84, which ranks as Venezuela's major producer. This well was completed in the late 40's for 28,500 b/d and has frequently produced over 30,000. Its production in December 1950 was over 560,000 barrels and its cumulative production to 1951 was 30,536,340 barrels.

Many of the visitors stayed in Venezuela beyond the date of closing, to see old friends, to take a closer look at field operations, or for other reasons. The Iranian delegate, Prince Farman Farmaian, gave a well-received talk in the College of Engineers which presented aspects of the Iranian viewpoint in the present dispute somewhat more dispassionately than is usually the case.

Alberta Nearing Gas Export

After a full month of hearings before the Natural Gas Conservation Board of Alberta at Calgary, sittings were adjourned to October 29. The hearings were directed to determination of the question whether reserves of gas have reached a point where export can be permitted without interfering with anticipated requirements for local consumption. Alberta officials have taken the position that reserves must be sufficient to cover estimated needs for home use over the next thirty years before shipment outside the province will be authorized. The board's estimate made a year ago was that reserves amounted to 4.7 trillion cubic feet and statements presented at the recent hearings were that additions were being made at the rate of 1,850 billion cubic feet per year. It was pointed out also that authorization of export would stimulate exploration and lead to the rapid upbuilding of total reserves.

Applications for permits to construct gas pipe lines were made at the hearings by a half dozen companies with details of proposed routes and capacities. This subject will be studied further when hearings are resumed. The opinion in oil and gas circles in Alberta is that permits for the construction of one or several lines will be issued in the near future.

Drill for Sulfur in Mexico

Two United States oil companies are in the middle of a sulfur-drilling program in the salt domes of Mexico's Gulf Coast. The search for the yellow mineral is now nearing the primary production stage by the oil companies and by several U. S. sulfur companies.

Leader in the field is Gulf Sulphur de Mexico, S.A., a subsidiary of the Pan American Sulphur Co. This company is owned jointly by officials of the Renwar Petroleum Corp. of Dallas and Corpus Christi, Texas, and the Woodley Petroleum Co. of Houston.

This firm has already drilled more than 50 wells of which it believes "more than half" are would-be sulfur producers. By the end of this month, it hopes to have $3,500,000 in loans from the Export-Import Bank and several private banking firms for erection of a 500,000-ton-a-year sulfur extraction plant.

The Texas oilmen, Roland Bond, president, and Guy Warren, vice president of Renwar, and J. R. Parten, president, and Martin Sandlin, vice president of Woodley, are developing two concessions near Jaltipan and Coatzacoalcos, in the State of Veracruz, totalling 292,380 acres. The plant is expected to be built on the 290,400-acre Jaltipan lease, the furthest developed to date.

Third Colomo Well Producer

Jose Colomo No. 3, in the field of the same name, has been brought in by Petroleos Mexicanos. The test is producing slightly over 500 barrels per day on a 5/16 choke and is considered as good a well as No. 1, which is currently producing 1,900 barrels per day. Pemex will have five rigs in this field early in December. Present schedules call for completion of ten wells in the newly discovered field by the end of this year.

Still in the gossip stage, but believed a possibility, are plans under which Petroleos Mexicanos would ask the Economy Ministry to checkerboard the new field, keeping half of the entire area for the government oil company and inviting private firms to drill on a percentage-of-production basis in the rest of the zone.

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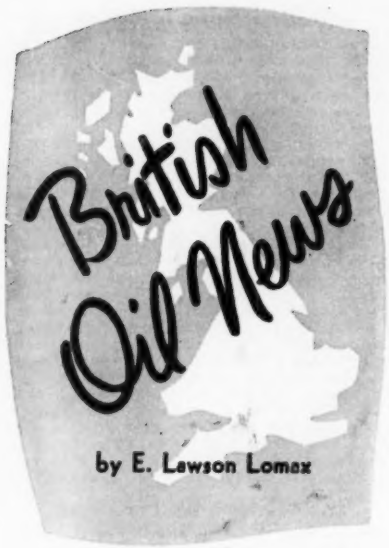
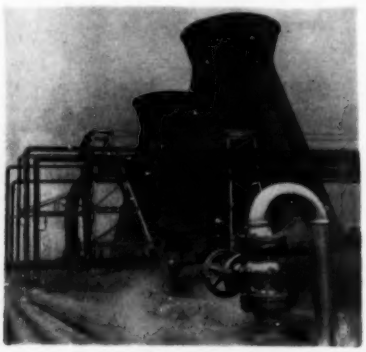


LONDON

Now that the Iranian situation has reached a state where it appears that a long time may elapse before oil from Persia will again become available to the western world, the increase in refining capacity in the United Kingdom assumes added importance. In the three months since shipments from Abadan ceased, substantial additions have been made to British processing capacity. At the recent opening of the country's most modern grease plant, C. M. Vignolles O.B.E., managing director of Shell-Mex and B.P. Ltd., stated that Shell refineries in the United Kingdom are now turning out petroleum products at the rate of 8½ million tons per year. Anglo-Iranian's operations have been stepped up to 6¼ tons annually including the enlargement of the plant at Grangemouth, Scotland, which now has a yearly output of 2¼ tons, and other smaller organizations have added to their capacity.



These twin 200-foot water cooling towers dominate the service area of Anglo-Iranian's Grangemouth refinery. Supply lines in foreground pass steam and water to the refinery.

Continental Facilities Added

On the continent, Anglo-Iranian Oil Co. has obtained a controlling interest in the German firm of Oëlwerke, Julius Schindler, oil operators and distributors, owning two small refineries. One of these is the Neuhof refinery, Hamburg, which has a crude capacity of 2,800 b/d with no cracking capacity and produces 175 b/d lubricating oil. At present, a new 500 b/d atmospheric distillation unit is being installed. The other is the Peine refinery, near Hamburg, which has a crude capacity of 450 b/d with 150 b/d lubricating oil blending capacity.

Progress At Coryton

Work is going forward on the erection of the plant which Vacuum Oil Co. Ltd. and Powell Duffryn are building at Coryton, near the mouth of the Thames. This refinery represents an investment of $18 million of British and American capital, will have a throughput of 850,000 tons per year and is scheduled for completion by January, 1953. It will specialize in the manufacture of lubricants, but will also produce motor spirit, diesel oil, fuel oil, and petroleum waxes. The Lummus Co. and Foster-Wheeler are the general contractors, and the greater part of the equipment is being fabricated in Great Britain.

The plant will include a Lummus two-stage distillation unit of 20,000 b/d capacity, separating the crude into five fractions and an asphaltic residue; light gasoline, naphtha, light gas oil, heavy gas oil, lubricating oil distillates and residue. Naphtha goes to a thermal reforming unit, heavy gas oil to a TCC unit, the light products from these units joining the light gasoline for solutizer treatment and ethyl blending. Light gas oil and the residue from the catalytic cracker are blended for diesel oils.

The residue from the vacuum distillation unit is submitted to propane deasphalting, the extract going for fuel oil; the raffinate, together with the lubricating oil distillates, is solvent-treated in a furfural unit, then MEK de-waxed, both of these plants working on Texaco systems. The treated oils are then clay percolated to finished products.

Council of British Manufacturers

Capt. G. P. Claridge R.N. (Retd.) has been appointed as chief executive of the Council. His appointment follows 39 years' service in the Royal Navy, for the most part in submarines. In recent years, he was responsible for administering and inspecting, on the accommodation and seamanship side, all naval ships built by private yards throughout the country, taking them over from the builders, and for maintaining good relations between the Admiralty and shipbuilding firms.

The annual general meeting of the Council, held on October 4, was preceded by a luncheon at which the principal speaker was Howard W. Page, shareholders' representative in the United Kingdom of Standard Oil (N.J.) and a director of Esso Petroleum Co. Ltd.

Company Reports

The reports of Vacuum Oil Co. and Powell Duffryn, who are equal joint participants in the new Coryton refinery project, show that both of these companies had a very successful year of operation in 1950, with substantial increase in trading profits. In view of the increased investments in the new refinery, each company has increased its capital, Powell Duffryn to £16,000,000 and Vacuum Oil Co. to £12,500,000. As further funds are required, drawings will be made upon the substantial loan which has been arranged with the Finance Corporation for Industry.

Fawley a Big Addition

Of outstanding importance in the development of increased refining capacity is the initiation of operations at the Esso Standard's great Fawley plant which was formally opened by Prime Minister Atlee on Sept. 14 with appropriate ceremonies. It will add another 6½ million tons of petroleum products, bringing total British capacity up to 21 million tons, which is slightly more than was contemplated by the original refining program.

International Road Congress

C. T. Brunner, director and general manager of Shell-Mex and B. P. Ltd., was one of the speakers at the ninth International Road Congress, organized by the Permanent International Association of Road Congresses which was held at Lisbon on Sept. 24. Mr. Brunner presented a paper, of which he was co-author, entitled "Economic justification of Road Works."

Open Largest Refinery

R. J. Cole (left) engineer in charge of construction of Esso Petroleum's refinery at Fawley, England, for Foster-Wheeler Corp., the general contractors, points out features of the plant to Prime Minister Clement Atlee who presided at the formal opening of the refinery.

Burma Oil Industry

It is announced that the British government has offered to lend Burma 2½ million pounds sterling to finance the Burmese government's share in a plan to get the country's oil industry on its feet again, on the condition that the Burmese government and the Burmah Oil Co. can agree to mutually satisfactory arrangements. The original request by the Burmese was for a loan of five million pounds. This joint venture envisages a new local company in Burma, the capital to be jointly held by the government and the company. It is pointed out however, that no return to the pre-war scale of operation will be possible until internal security is assured.

Caltex Tanker Launched

The M/S "Caltex Kenya," first of nine tankers now being built for Overseas Tankship (U.K.) Ltd., Caltex group affiliate, was launched at Sunderland on Sept. 19. The vessel, built by William Doxford & Sons Ltd., Sunderland, is 491 feet in length, 61 feet 9 inches beam, a deadweight tonnage of 12,000, is powered by a 5,150 bhp Doxford diesel and will have a trial speed of 13.75 knots.

The completion of this new tanker building program will considerably augment the fleet of Overseas Tankship (U.K.) Ltd. for the transportation of petroleum products to the Regent Oil Co. Ltd., marketing agent of Caltex products in the United Kingdom and to Caltex associates elsewhere in the sterling area.

Following the launching, at a reception in honor of the vessel's sponsor, Lady Jenkins, E. J. Shearer, managing director of Overseas Tankship (U.K.) Ltd., proposed the toast of the shipyard.

Oil and the Air

OIL PRODUCERS and refiners in the Middle East since 1912, Anglo-Iranian Oil Company and its associated companies operate eleven refineries in the United Kingdom, France, Germany, Italy, Israel, Irak, Kuwait and Australia. Their sales organisation includes major marketing or supply interests in Europe, Asia, Africa and Australasia, with international ships' bunkering and aviation services.

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Air helps to put oil on the map. This high altitude vertical air photograph of marshy country is part of an air survey made for Anglo-Iranian's geologists.

The oil that air survey helps to find provides fuel for the world's most modern aircraft. Many record-breaking flights have been fuelled by the BP Aviation Service.

International news and notes

Anglo-Egyptian Has New Home

Ensconced in a new office building, largest in the Near East, and with a newly elected board of directors, Anglo-Egyptian Oilfields Ltd., a member of the Royal Dutch-Shell Group, opens a new chapter in its history. Decision to locate the headquarters of the company in Cairo was reached some time ago, to take effect when the building was completed, and it was there that the directors held their first meeting on July 10.

The building, known as Shell House, is a thoroughly modern 10-story structure and is an impressive feature of the city's skyline. It was designed by Mahmoud Bey Riad, one of Egypt's most progressive architects, and contains over 500 rooms in addition to the spacious main floor, storage quarters and the unusual feature of a cinema theater seating 160 persons. In addition to Anglo-Egyptian, the building has as tenants Shell Company of Egypt Ltd. and Anglo-Iranian Oil Co. (Egypt) Ltd. The staff of Anglo-Egyptian Oilfields Ltd. occupies the fifth, sixth and seventh floors of the building. The quarters of the medical section on the fourth floor include an X-ray room, laboratory and dispensary. Departments having direct contact with the public, such as sales, materials and financial, are situated on the lower floors. The top floors have been set aside for laboratories, lecture halls, the photographic department, museum and library.

Officials of the managerial staff of Anglo-Egyptian include R. G. Searight, general manager and director; G. S. Taitt, manager and director; F. T. Haddock, assistant general manager and director and Abdelsalaam Bey Osman, assistant general manager in charge of public relations and director. Other directors are: H. E. Hassan Moukhtar Rasmy Pasha, C.B.E.; the Hon. Sir Cecil Campbell, K.B.E., C.M.G.; H. E. Hussein Sirry Pasha and I. D. Davidson.

Revise African Refinery Plans

Standard-Vacuum Oil Company has decided to increase the size of its refinery at Durban, South Africa, by more than 50 percent and to expand the design so as to give a wider range of products than was contemplated when the project was first announced last March. Originally scheduled as a $12 million project, the Stanvac plant will now involve an investment of more than $17 million and will have a design capacity of approximately 15,600 barrels of crude oil per day.

Maximum flexibility is provided for in the design of the new plant, which will include a combination-type unit, including fluid catalytic cracking, crude distillation and thermal reforming. Foster Wheeler Corp., recently awarded the construction contract, already has a team of engineers in the Union of South Africa checking into the availability of materials, the facilities offered by local sub-contractors, labor conditions and other problems which they will encounter as soon as construction actually starts. Several shipments of special equipment and materials which can be obtained in adequate supply only from sources outside the Union were delivered to the site during August. Groundbreaking for the main refining units is not scheduled to start for about six months, although work has already begun on a rail spur which will serve the refinery. It is estimated that the plant will be put into operation late in 1953 or early in 1954.

Katalla District Geology

A report and maps by D. J. Miller, geologist, Geological Survey, on petroleum possibilities in the Katalla district, Alaska, has been placed in open file for public inspection. The Katalla field is on the Gulf of Alaska, 50 miles southeast of Cordova. During the period from 1902 to 1933 it produced about 154,000 barrels of high gravity paraffin-base oil, which represents the entire output of Alaska thus far. This report summarizes the present status of information on the geology of the Katalla district as related to oil possibilities and is based largely on geologic investigations undertaken in the Katalla district in 1944 and 1945.

The report is on file in the offices of the Geological Survey, room 1033 (Library) GSA Building, Washington, D. C.; room 100 Old Mint Building, San Francisco, Calif.; Juneau and Fairbanks, Alaska; and at the office of the Bureau of Mines, Federal Building, Anchorage, Alaska.

Seeks Tariff Reduction

Luis Meza, assistant manager of Petroleos Mexicanos' export department, recently appeared before the United States Tax Commission to seek a reduction of Washington's import levies on Mexican crude. His application was backed by U. S. firms importing from Mexico and opposed by the American Coal Producers and Independent Petroleum Associations. Both the latter groups cited Mexican crude as a competitor to U. S. produced fuels.

First meeting in Cairo on July 10 of the new board of directors of Anglo-Egyptian Oilfields, Ltd. Left to right: H. E. Hassan Moukhtar Rasmy Pasha, C.B.E.; the Hon. Sir Cecil Campbell, K.B.E., C.M.G.; H. E. Hussein Sirry Pasha; R. G. Searight; G. S. Taitt; Abdelsalaam Bey Osman and I. D. Davidson.

Magnetometer Survey in India

The governments of Pakistan and India have granted Standard-Vacuum Oil Co. permission to make a geophysical survey of the Bengal Basin area by airborne magnetometer. The aerial reconnaissance, covering a 73,000-square-mile section of the great alluvial plain at the head of the Bay of Bengal, was scheduled to start Oct. 1. The project will be the first magnetic survey by air ever conducted in Asia and the Stanvac oil exploration staff's first use of the air-borne magnetic instrument. The aerial survey is to be conducted by Fairchild Aerial Surveys, Inc. and will require about four months time. The technicians and the special plane for the survey have been based at Dum Dum Airdrome, Calcutta, where laboratory facilities for the processing of the magnetic data are being established.

Stanvac has been a petroleum marketer on the sub-continent of India since the 1890's. The government's permission to make the geophysical survey does not involve drilling rights.

Gas Blowout Wrecks German Rig

The accompanying photograph shows the result of a gas blowout which took place near Darmstadt in the upper Rhine valley in the course of drilling the wildcat Wolfskehlen 1. The blowout occurred as the crew was pulling the drill string to take a core. The gas ignited, shot a flame 100 feet high and burned for four days until the well collapsed. After the fire and subsequent mud eruption subsided, the debris was cleared away, a new rig was brought in, 5,000 bags of cement were poured to fill the hole caused by the explosion, drill columns were sunk and cemented and drilling was resumed.

Colombian Concessions

In the first half of 1951 the Colombian government issued nine new concessions to foreign oil companies. Four previously granted concessions were surrendered, bringing the total in force as of June 30 to 12. Of these Shell held four, Texas, International and Richmond two each, Socony and Independent one each.

Open New Filling Plant

The Burmah Oil Co. has opened a new bulk filling plant for tank trucks at its Dunnedaw terminal. The loading dock is capable of filling eight trucks simultaneously. BOC operates a fleet of 40 tank trucks in the Rangoon area to deliver petroleum products to its customers.

Dr. Zuloaga Joins Creole Board

Dr. Guillermo Zuloaga

Dr. Guillermo Zuloaga has been elected a director of the Creole Petroleum Corp. to succeed Willard M. Hall, who retired from active service some months ago and now has resigned as a director. Dr. Zuloaga is a geologist with eleven years service with the company. He began with Creole in 1939 as assistant manager of the geological department. He became manager of the department in 1945 and in 1948 was appointed to the management committee in which post he will continue.

Dr. Zuloaga was born in Caracas in July, 1904 and received a degree in philosophy and letters from the Central University of Caracas in 1924. He received the degree of Doctor in Geology from the Massachusetts Institute of Technology in 1930. He returned to Venezuela the same year and joined the Ministry of Development as a petroleum inspector. Subsequently, he assisted in founding the geology and mining technical service section of the Ministry with which he remained until joining Creole.

Petrofina to Drill in Mexico

The Belgian oil company, Petrofina, through its Mexican affiliate, Mexofina, will drill a wildcat on the Macutapec structure in the State of Tabasco without participation of major U. S. stockholders in the Mexican-American Independent Oil Co. (Cima). Under the terms of the contract between Petrofina and American Independent, the U. S. firm may elect to participate or not in new drilling operations. It chose the latter course in the case of the new south Mexico wildcat. Edwin W. Pauley, who still controls 13 percent of Cima, will participate in the new operation.

The operators hope to find production in a cretaceous limestone formation. Should they find what they are looking for, it will be the first limestone production in the Isthmus of Tehuantepec region.

French Group in Mexico

A group of French bankers operating independently of Compagnie Francaise des Petroles have employed a Mexican attorney to form a local corporation through which they hope to negotiate a drilling contract with Petroleos Mexicanos. The group, headed by an official of the Bank of Worms, said, "We are not seeking publicity, but oil," and added, "should we finally conclude a contract with Pemex, we will probably employ domestic or American drilling contractors to handle all technical work under the agreement except geology."

To Build Canadian Plant

Gordon R. Henderson, chief engineer of Polymer Corp., Sarnia, Ont., has resigned to become general manager of Canadian activities of Catalytic Construction Co. His headquarters will be in Sarnia. First Canadian job of Catalytic Construction Co. will be Sun Oil Co.'s recently announced refinery at Sarnia. This project, to cost in the neighborhood of $10 million, will include a Houdriflow catalytic cracking unit. The refinery is scheduled for completion in March, 1953. Mr. Henderson joined the engineering staff of Shell Oil Co. of Canada at its Montreal refinery in 1932 and became chief engineer of that plant in 1936. He remained at Montreal until 1940 when he was given charge of construction of an $18 million Shell Oil refinery at Heysham Lanes, England. In 1942 he became chief engineer of that refinery.

Study Peat Gasification

Research is being undertaken in the Republic of Ireland on a scheme to produce petrol from turf. Scientists employed by the Irish Turf Board now believe that gasification of turf on a commercial basis is feasible. The £60,000 program is being financed jointly by the Irish government and E.C.A. The scheme has been worked out by research scientists connected with the Turf Board, the Irish State Chemical Co.; the Irish Institute of Industrial Research and Standards; the Irish Electricity Supply Board; officials of the Irish Department of Industry and Commerce and E.C.A. The contribution by E.C.A. is $30,000, but the hiring of technicians and all non-dollar expenditure will be controlled by the Irish government.

Heads Halliburton Offices in Mexico

Alberto Fuentes R. has been named Mexican representative in charge of the Halliburton Oil Well Cementing Co.'s new Mexico City offices at Filadelfia 40, Mexico, D.F.

REFINERY VESSELS FOR THE

PETROLEUM INDUSTRY

Above:
This illustration shows a Catalyst Storage Drum on its way to the Refinery of Scottish Oils Ltd. at Grangemouth. Sizes: 16 ft. dia. x 60 ft. 10 in. long. Weight 36 tons.

At the left is shown a small section of our works at Motherwell, where high-pressure vessels such as Fractionator Towers etc. are fabricated to Lloyds' Class I. A.P.I. - A.S.M.E. and other internationally recognised codes, using our own stress-relieving furnace, X-Ray equipment and Laboratory.

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Drilling Activity Increases In Venezuelan Fields

While the matter of customs duties on oil imported into the United States was being debated in Washington, the industry in Venezuela continued to set new record high figures of production. In the week ending Sept. 24, the flow reached a peak of 1,735,114 barrels a day, and it was felt in some circles that the figure might reach two million barrels daily next year, providing the necessary steel could be made available. However, many operators were drilling ahead with fingers crossed, hoping that tubing and casing ordered months ago would arrive in time to save the holes, and were casting about meanwhile for salvageable steel to be pulled from old wells, abandoned flowlines and other last-ditch expedients. The table below reviews production by companies for the last four months.

The number of rigs operating on new drilling, after climbing from 78 in January to 96 in July, remained stationary at that figure in August and early September. The total is still a long way from the all-time high of December, 1948, when 138 rigs were operating in Venezuela. However, Sinclair recently added a second rig in Guere field, Phillips picked up a fourth for San Roque operations, and there are indications that the grand total will soon break the century mark again. Distribution of rigs among the companies in early September was as follows:

Atlantic	2
BCO, Ltd.	1
Creole	15
Mene Grande	26
Phillips	4
Pantepec	1
Sinclair	2
Shell	30
Socony	5
Texas-Mercedes	7
Richmond	3
	96

The total number of geological and geophysical parties in the field has been on the decline in recent months, but that is a typical rainy-season trend, as the following comparison with 1950 shows:

	1951	1950
April	38	33
May	36	33
June	34	30
July	32	30
August	31	28

In this kind of operation, too, 1951 shows a marked gain over 1950; and the number of parties will begin to increase as the late fall and winter dry season approaches and makes the ground passable again.

In Western Venezuela, wildcats drilling as September ended included Richmond's Zulia 3G-1, halfway between Boscan and Ensenada at 7,382 feet. (Richmond also spudded a rank wildcat, Perico-1, about 25 miles southwest from the town of Rio Hacha in Colombia. This is on the western side of the narrow Goajira Peninsula, down the middle of which the Colombia-Venezuela border runs, and hence is of considerable interest in Venezuela.)

Shell's CQ-1, spudded in September 1949 near the mountain town of Valera, was undergoing a lengthy testing program at 11,386 feet. Shell was also drilling a deep test, LS-1387, five miles offshore into Lake Maracaibo from the Pueblo Viejo field, at nearly 8,700 feet. The same company's Sibucara-7 and 8 were drilling at 14,000 and 10,500 feet respectively, so near the city of Maracaibo that the towers have been painted in warning colors for the benefit of planes. The Cretaceous tests C-149 and C-150, at Concepcion and San Ignacio respectively, were drilling both at about 10,000 feet.

Texas' wildcat El Callao-1, on the shore of the Gulf of Venezuela, was approaching 8,000 feet. Mene Grande spudded an important limestone test, 1-MXZ-1, in a wholly new area northwest from the Mara field.

In Guarico, Atlantic continued to run one rig each on development wells in Ruiz and Tucupido, while a third rig alternated between development and exploratory holes in the Saban area. Sinclair continued diamond-core drilling on the wildcat Piedra Azul-1, seven miles north from Tucupido field at 9,300 feet. A second Sinclair hole in Guarico was Dakoa-1, spudded in September about two miles southwest from Atlantic's Ruiz wells and preparing to run casing at about 4,500 feet. Texas-Mercedes rigs in Guarico were mainly confined to development drilling in the Mercedes field, with an occasional new-pool test.

In Eastern Venezuela, Creole abandoned East Maron-2, in northwest Anzoategui, at 11,500 feet and began on East Maron-3. Farther east, they were drilling Guanoco-2 at 6,100 feet in an effort to evaluate a large block of acreage around the once-important asphalt lake of the same name. In Creole's Quiriquire field, deep test Q-533 was resumed after a long suspension, and was drilling at 7,500 feet.

In Anzoategui, Phillips completed San Roque B-26 at 11,125 feet and spudded in on B-9. Their Laloma-3 was still testing at 10,286 feet. Aragua-8 was completed at 8,342 feet. Sinclair were operating two rigs in Guere field, with No. 6. drilling at 8,000 feet and No 9. rigging up. Socony successfully completed Esquina-1 at 6,945 for about 500 b/d, and were drilling on North Chimire-1 (8,355 feet) and Cantaura-1 (5,600 feet) as September ended. Texas Company made a successful completion of Mata-2 in the northeastern part of the Oficina complex of fields, and spudded in Mata-5 at a point two miles west.

Mene Grande's Apamate-1 (jointly owned with Creole) was an important new-field discovery (500 b/d) in August, in which month this company made 21 completions of all types for a new record. East Caico-1 was a Meneg new-field discovery at 8,430 feet in September (over 700 b/d from two zones). South Guara GXG-501 and Tapuco-1 were new-field tests spudded by Meneg in September, while Divi-1 in northern Anzoategui, spudded in March, was fishing at 6,600 feet.

Motorists in Venezuela have been accustomed to buying their gasoline at a government-fixed rate of 10 centimos per liter, 12 cents a gallon, but with considerable grumbling over the tendency of the gas to carbonize, produce ping in motors, and eat holes in exhaust pipes. As of the end of September, two new products, "Super Shell" and "Esso Extra" with an octane rating of 85 (the old was 60) were being offered, at a 100 percent increase in price.

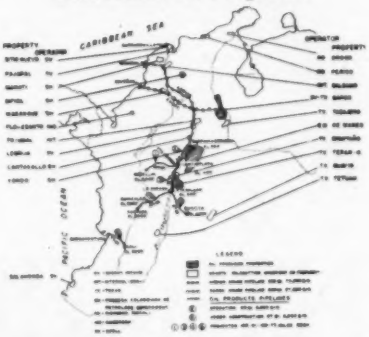
Arrive for Procurement Conference

Arthur Proudfit, president of Creole Petroleum, and Richard McCurdy, general manager of Asiatic Petroleum Corp., arrive from Caracas for conference on material procurement for the oil industry in Venezuela. Left to right: Mr. Proudfit, Joseph Fly and Robert Miller of Creole; Mr. McCurdy; Galfrid Dunsterville and William Starrgenburg of Asiatic.

Mexican Technicians to Meet

Mexico's Association of Petroleum Industry Doctors, who specialize in oil field practice, will hold its first convention Nov. 28 to Dec. 2 at Petroleos Mexicanos Hospital in Poza Rica, in the State of Veracruz. All private practitioners desiring to attend the sessions will be welcomed.

Colombian Oil Properties



An article published in the September issue of this magazine dealt with developments in the oil industry of Colombia. Accompanying it as an explanatory feature was a map showing the location and ownership of producing properties and exploratory concessions. Through an error a number of these were incorrectly attributed. In the interest of accuracy the map is republished herewith with corrections to show the companies directing operations in each of the several areas.

Colombian Completions

Fourteen new wells were spudded in Colombia during July compared with 10 in June. Completions in July totaled eight compared with nine in June. Total producing wells as of June 30 was 1,374.

Venezuelan Production by Companies

(Barrels Daily)

	MAY			JUNE			JULY			AUGUST		
	East[1]	West	Total	East[2]	West	Total	East[3]	West	Total	East[4]	West	Total
Creole	134,844	578,515	713,359	135,312	587,624	722,936	136,058	590,082	726,140	134,342	594.891	729,233
Shell Co.'s	.....	523,691	523,691	.....	519,505	519,505	.....	523,184	523,184	.....	519,277	519,277
Mene Grande	237,617	62,414	300,031	233,179	62,502	295,681	241,754	62,077	303,831	241,067	60,769	301,836
Socony-Vacuum	46,659	.....	46,659	47,501	.....	47,501	48,842	.....	48,842	48,796	.....	48,796
Texas-Mercedes	33,636	14,937	48,573	32,577	14,327	46,904	32,440	15,658	48,098	33,708	12 851	46,559
Ven. Atlantic	20,048	.....	20,048	18,744	.....	18,744	18,548	.....	18,548	16,976	.....	16,976
Richmond	.....	16,341	16,341	.....	17 950	17,950	.....	18,155	18,155	.....	17,550	17,550
Sinclair	11,877	.....	11,877	.....	12,626	12 626	12,551	.....	12,551	13,011	.....	13,011
Pantepec	10,550	.....	10,550	10,030	.....	10,030	10,013	.....	10,013	9,643	.....	9,643
Phillips	6,233	.....	6,233	6,545	.....	6,545	6,787	.....	6,787	5,204	.....	5,204
BCO, Ltd.	.....	998	998	.....	1,004	1,004	.....	982	982	.....	929	929
Totals	**501,464**	**1,196 896**	**1,698.360**	**483,888**	**1,215 538**	**1,699,426**	**506,993**	**1,210,138**	**1,717,131**	**502,747**	**1,266,267**	**1,709,014**

[1] includes 43,735 barrels from Guarico [2] Includes 42,147 barrels from Guarico [3] Includes 41,664 barrels from Guarico [4] Includes 40 685 barrels from Guarico

PETROLEUM CHEMICALS DIVISION

DU PONT NEWS

November ★ One of a Series of Interest to the Petroleum Industry ★ 1951

WHAT IS TEL?

Motor fuel antiknock compound is made by blending various halogen carriers, dye and kerosine with tetraethyl lead.

When used in an internal combustion engine, tetraethyl lead by itself would form nonvolatile decomposition products which would deposit on the cylinder head and other surfaces of the combustion chamber. To reduce the deposition tendency of these products by increasing their volatility through chemical reaction, scavengers in the form of ethylene dichloride and ethylene dibromide are added. The proportion in which these scavengers are employed is determined initially in laboratory engines and proof-tested in extensive road tests in commercial equipment under actual operating conditions.

Sufficient dye is added to give a distinctive color to the mix as all the other ingredients are colorless or water white. Kerosine in limited amount is used as a standardizing agent to insure uniformity of TEL content in the mix. It is a stable product up to 330°F. but begins to decompose above that temperature.

Du Pont GAS GUARD prevents fuel line freezing

Du Pont Gas Guard is another product designed to help motorists get better car performance. Gas Guard helps prevent ice from forming in gasoline lines of autos, trucks and tractors.

Cold-weather engine stalling, spitting and sputtering due to the presence of water in gasoline can also be prevented by Du Pont Gas Guard. By keeping the system ice-free, it contributes to quicker starting and smoother engine performance, even in sub-zero weather.

One pint of Du Pont Gas Guard in 15 gallons of gasoline, for example, will prevent freezing of as much as 10 ounces of water at 30° below zero F. During moderate freezing and zero weather, a pint of Gas Guard every 1,000 miles of driving will give adequate protection.

It is also highly effective as an antifreeze in diesel fuels. At −24°F., one pint of Gas Guard in 10 gallons of diesel fuel will keep 14 ounces of water from freezing, thus preventing crystals from clogging the jets.

It is harmless to the carburetor, fuel pump and other engine parts when used as directed. Du Pont Gas Guard is distributed in pint cans through service stations, garages and car dealers.

Du Pont Test Fleet Accumulates Deposit Data Under Actual Traffic Conditions

WHEN Du Pont engineers undertook a study of engine deposits and their effect on octane requirement, they determined to make certain that the findings would be of practical value to refiners. To study only the deposits built up in laboratory engines was not enough.

READY FOR A DAY'S TEST RUN, the four Oldsmobiles and four Pontiacs used in the deposit studies are shown with their drivers in front of the Du Pont test fleet garage.

These engineers wanted the study to be truly representative of the deposits accumulated in the average car, powered by average gasoline, under average traffic conditions. But how could they be sure the deposits from any given auto engine would be representative? The Du Pont test fleet provided an answer.

A test course approximating typical highway and city driving conditions was set up. About 64% of the course was through downtown Philadelphia traffic. The remainder over nearby country roads.

Starting with deposit-free engines, eight cars were driven over the course daily until a total of 8,500 miles was recorded on each car. Four of the cars were 1950 Oldsmobile 98's with hydromatic transmissions. The other four were 1947 Pontiac 8's with 1948 engines and standard transmissions.

Before starting the test, each car was road-checked for gasoline mileage, acceleration time and octane requirement. The engines were not "doctored" in any way. Each was tuned up according to the manufacturer's standard specifications . . . and kept that way until completion of the test. To assure uniform operation, distributor settings were constantly checked throughout the test.

The fleet was set up in pairs of cars. Each pair used identical fuels and lubricants. This made it possible for the performance of one car to be checked against that of its identical mate . . . an additional assurance of uniform engine performance.

The cars were operated as a group, although no attempt was made to maintain exact formation in heavy traffic. The city course was covered several times each day. This helped to vary the traffic density conditions and the amount of start-and-stop driving . . . with each car encountering about the same conditions during a day's run.

The cars were equipped with recording tachographs to give an accurate account of their individual operations.

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

OVER

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CONTINUED

Test Fleet

These instruments helped supply many valuable statistics. For example, they showed that during a 5-day period the average number of stops per car per 8-hour shift was 328. And all these stops occurred in an average of 101 miles of operation.

Sixteen drivers, working two shifts, participated in the test. To control the driver effect, the men were alternated so that each car was driven approximately the same time and mileage by all drivers.

A driver-leader was in charge of each shift. The leaders were responsible for the safe performance of the fleet in the field.

Driving safety and courtesy is emphasized in all Du Pont test fleet operations. In addition to turning in an excellent safety record, the fleet drivers were able to help several motorists in trouble on the road. For example, since all test cars carried fire extinguishers, the Du Pont drivers were in a position to put out a number of highway auto fires which might otherwise have been both hazardous and damaging.

At 8,500 miles the test car engines were taken down and the quantity and composition of their deposits investigated. As was expected, much

THE TWO DRIVER-LEADERS are also trained mechanics. Here they are inspecting the torn down engines of the eight cars used in the recent Du Pont deposit studies.

new information was gained from the test. This, along with other data, was evaluated at the Du Pont Petroleum Laboratory and the results are now available to refiners in a paper recently published. This paper was presented by L. F. Dumont of the Petroleum Laboratory staff at the June S.A.E. meeting in French Lick, Indiana. Reprints of the paper with the title, "Possible Mechanisms by which Deposits Accumulate and Influence Knock" are available on request.

Du Pont test fleets constantly work on road tests of this type. In addition to the one described above, a 5,200 mile test with "dirty" fuel has just been completed. And another deposit study is now being made with the Du Pont heavy-duty truck fleet in El Monte, California.

Assistant Director of Petroleum Laboratory

W. E. BETTONEY

W. E. BETTONEY was appointed Assistant Director of the Du Pont Petroleum Laboratory in June of this year. In this capacity he directs work on combustion chamber deposit studies and other petroleum research projects. He is also in charge of test fleet operations. Previous to this assignment, Bettoney headed the Engineering Division of the Laboratory.

He came to Du Pont in 1946 from Universal Oil Products. With the Chrysler Corporation during World War II, he worked on the development of B-29 engines at the Dodge Chicago plant. Before this, Bettoney spent three years as a government test engineer on full-scale experimental airplane engines at Wright Field.

He graduated from the University of Maine with a B.S. in mechanical engineering and did graduate work at Columbia and New York Universities.

New TEL Blending Chart for Laboratory Convenience

A reference chart for blending Du Pont Tetraethyl Lead Compound–Aviation Mix with small quantities of gasoline is now available to refiners. It was prepared by Du Pont to aid laboratory personnel in the leading of test fuels and samples.

In table form, the chart shows the number of milliliters of Du Pont Aviation Mix required for fuel samples from 1 to 20 liters and from 0.1 to 100 gallons. Any desired concentration from 0.1 to 6.0 ml TEL/gal. can be prepared from the table.

In addition, information on the properties, composition, conversion factors and dye concentrations of Du Pont TEL Aviation Mix is included on the reverse side. Ask the nearest Du Pont district office or write direct to Du Pont for your copy.

MOVIES AVAILABLE

Prints of the following Du Pont films are available to oil companies for training and public relations purposes. They may be borrowed or purchased. Address request to nearest Petroleum Chemicals Division district office.

Pipeline on Wheels–A 26-minute, full-color movie on tank truck safety. Suitable for both training and public relations purposes.

What Makes A Gasoline Good–An 18-minute cartoon movie in color. Presents the story of how high quality gasoline is made in easy-to-understand form. Ideal for dealer training meetings.

In addition to the above, Du Pont makes available a special library of films of particular interest to the petroleum industry.

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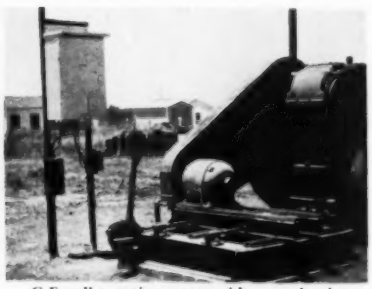
GENERAL ELECTRIC for many years has been a leader in the development of all types of electric equipment of outstanding quality and dependability for drilling, pumping, refining and transportation. Not only has the oil industry found that the G.E. monogram means assurance of reliability, but also oil men have found General Electric engineers ready at all times to co-operate in designing and applying electric equipment that would meet special conditions of service.

The General Electric Company manufactures complete electric equipment for the generation, transmission, distribution, and utilization of power in the oil industry. In addition to the apparatus listed, it builds gas turbine generators, steam turbine generators, mechanical drive generators, capacitors, switchgear, lightning arresters, oil circuit breakers, control equipment for all types of motors, meters, recording instruments, selsyns, copper-oxide rectifiers, heating devices, photoelectric relays, wire, conduit, etc.

OIL-WELL PUMPING



G-E well-pumping motor with control unit.

With this new G-E motor-and-control team, you can coax along wells which do best when pumped slowly for long periods. You can step up the pace of those that can take it. In fact, you can tailor the pumping of any individual well to insure maximum life and yield.

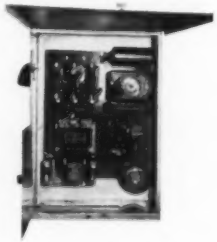
You simply preset the proper pumping cycle on the G-E starter. Its built-in timing mechanism does the rest, automatically starting and stopping the pump. By eliminating the need for frequent supervision, one pumper can cover more wells and devote more time to other important duties.

From the standpoint of pumping life, G-E drip-proof, splashproof motors also offer this definite advantage: they possess electrical characteristics which act to cushion the shock and strain of reciprocating motion. Moreover, mechanically, these motors are well protected from wear, weather, and electrical breakdown.

G-E application engineers are ready to help you in selecting motors and control to fit your specific conditions.

General Electric factory-assembled magnetic control, specially designed for oil-well pumping service, incorporates complete electrical protection for the motor, ample protection against weather, and provision for automatic intermittent operation of the pumping unit. Each control consists of a fusible disconnecting switch, a triple-pole magnetic switch with temperature overload relays, a manually reset under-voltage relay, a time switch, a "Hand-Off-Automatic" transfer switch, and a service protector against lightning, all enclosed in a weather-resisting cabinet arranged for pole or wall mounting.

With this equipment, it is possible to pump intermittently for predetermined periods to meet proration or well requirements. This is done automatically by the proper setting of the time switch.



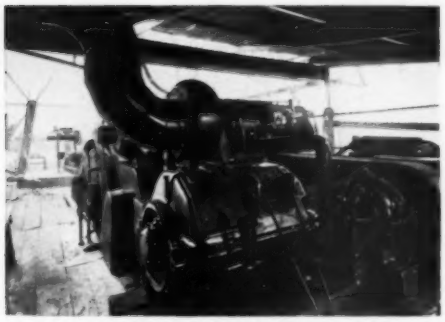
NEW G-E PYRANOL CAPACITOR WITH CABLE CONNECTION

Low operating power factor and high reactance in oil field power systems mean a large voltage drop . . . often too low voltage at the motors for peak performance. General Electric's new Pyranol Capacitor, especially designed for oil field operation, helps improve the power factor and reduces voltage drop. G-E Capacitors also reduce transmission losses, boost circuit's loadability, and conserve transformer and generator capacity. They are easy to install and require a minimum of maintenance. Available in ratings 2, 3, 4, 5, and 6 kvar, 460 volts. There are no extras to buy. Each Capacitor comes with a four foot flexible flamenol jacketed cable with watertight connector. The new G-E Pyranol Capacitor comes ready to perform and ready to save you money.

DIRECT-CURRENT ROTARY-DRILLING EQUIPMENT

The use of direct-current equipment for rotary drilling is one of the most modern developments in the oil fields. It provides the drilling rig with the extreme flexibility and highly efficient speed control afforded by direct-current motors, and with the same wide speed range and torque-speed characteristics as with steam-engine drive. The motors are operated by the well-known system of generator-voltage control, thus requiring direct-current generators at each rig. These may be driven by alternating-current motors, and thus operate from central-station power, or by internal-combustion engines, making the system highly desirable for locations not economically reached by electric-power service.

Equipment can be furnished with any capacity desired, from light rigs for shallow wells, to high-powered rigs for drilling by the most modern methods in deep territory.

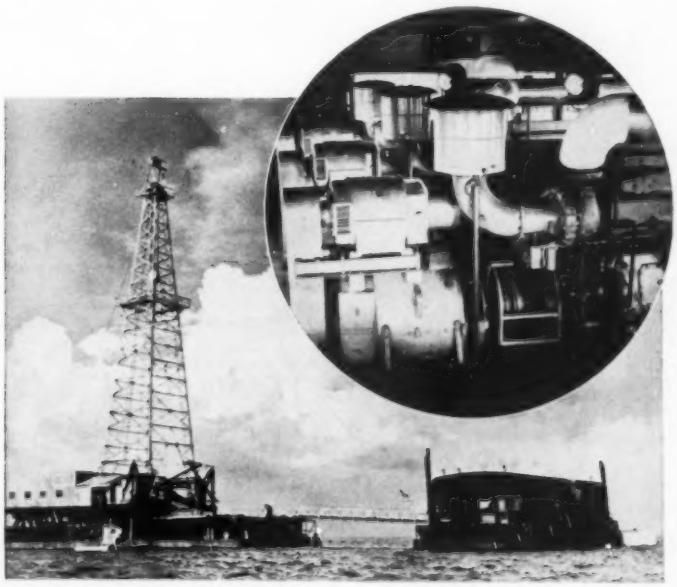


G-E 700-hp (intermittent rating), direct-current draw-works motor, Type MDP, of Fain Drilling Co.

G-E portable generating set with control for d-c rotary-drilling rig.

Electric drive is especially suitable for off-shore drilling projects because of the relative ease of transmitting power electrically through flexible cables from the power barge to the drilling rig.

The diesel-electric rig combines the fuel and water economy of the diesel engine or turbine with the superior flexibility of control of the d-c electric drive.

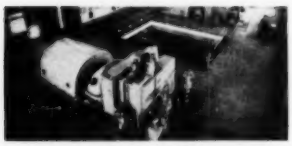


The G-E engine governor control is one of the most outstanding features of the G-E control for engine-electric drilling rigs. Located on each engine, it provides for automatic reduction of the engine speed when drilling conditions permit. This contributes to reduced engine maintenance and longer engine life.

Three 500 KW G-E generators with top-mounted exciters driven by diesel engines with G-E governor control located on the power barge shown.

Courtesy of Lane Wells Co. Night view of oil field illuminated by G-E lighting equipment.

REFINING



2 G-E 5000-kw double automatic extraction turbines and switchgear. Atzcapotzalco Refinery, Mexico.

G-E outdoor explosion-proof unit substation. Atzcapotzalco Refinery, Mexico.

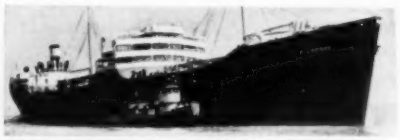
3 G-E 35-hp horizontal, squirrel-cage motors driving circulation impellers in oil-cracking process.

Oil-refinery requirements are wide and varied. Pumps of every class, both high- and low-pressure, for oil, water, brine, acid, and oil products are in general use. Turbines, power station auxiliaries, fans and blowers, compressors, centrifuges, process machinery, automatic process timing control, Cottrell-precipitation apparatus, material handling equipment, yard locomotives, and car spotters are only a few of the host of applications in refineries. In oil refineries, continuity of power supply is an absolute necessity for maintaining operation of vital processes in order to minimize hazards and assure uniformity of products.

During the rapid growth of the petroleum industry, G-E engineers, trained in application and research, have assisted in many original developments and have kept pace with its evolution.

TRANSPORTATION AND MARKETING

Electric Welding Pipe Line



Oil tanker fully equipped with G-E electric equipment

Gasoline pump motor
(filling station)

G-E motors driving gathering and pipe-line pumps keep the oil and gasoline flowing through a large part of the country's pipe-line network.

Many of the modern oil-tankers are powered with G-E equipment, including turbines, turbine-generators, motors, switchgear and control.

Hundreds of miles of pipe lines have been welded with G-E welders and electrodes, single-operator, direct-current welders, both motor and engine driven.

BULLETINS

Capacitors—Low Voltage Industrial	GEA-2742
Capacitors—High Voltage Industrial	GEA-2860
A-c Arc Welders (English)	GEA-4081
A-c Arc Welders (Spanish)	IGE-S-3549
D-c Arc Welders (Spanish)	IGE-S-3544
Air Break Explosion-Proof Starters	GEA-5167
Oil-Well Pump Starters	GEA-3805
New Low-Voltage Oil-Immersed Starters	GEA-3541
Combination Magnetic Starters for Oil-Well Pumping	GEC-720
Totally Enclosed Induction Motors with Surface Air Cooler	GEA-3109
Unit-Cooled Direct-Current Motor	GEA-4469
Armored Mill Motors	GEA-4654
Tri-Clad Open (Drippproof) Polyphase Induction Motors	GEC-264
Tri-Clad Open (Drippproof) Polyphase Induction Motors	GEC-402
Tri-Clad Induction Motors (Spanish)	IGE-S-3543
Synchronous Motors (Spanish)	IGE-S-3537
Condensed Motor Catalogue (Spanish)	IGE-S-3593
Steam Turbine Generators	GEA-3277
Induction Motor Generators	GEC-302
Thyrite Controlled D-c Generators	GEC-501
Gas Combustion Turbines	GEA-5530
Unit Substations—600 v. and below	GEA-3592
Load Center Unit Substations for Semihazardous Locations	GEA-4085
Air Circuit Breakers in Explosion-Proof Boxes	GEA-3447
Air Circuit Breakers	GEA-3642
Electrical Equipment for D-c Engine-Driven Drilling Rigs	GEA-4456
Equipment for Electrified Oil Pump Lines	GEA-5423
New Limitamp Controllers	GEA-5409
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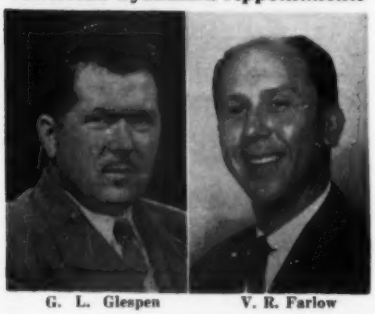
American Cyanamid Appointments



G. L. Glespen V. R. Farlow

American Cyanamid has appointed V. R. Farlow as sales supervisor and G. L. Glespen as technical supervisor of the petroleum chemicals department. Since 1945, Mr. Farlow has been technical representative on petroleum chemicals in the company's Chicago office, and Mr. Glespen has been supervisor of catalyst products at the company's headquarters in New York. F. E. Eck will replace Mr. Farlow in Chicago.

Pan-Am Southern Opens Headquarters

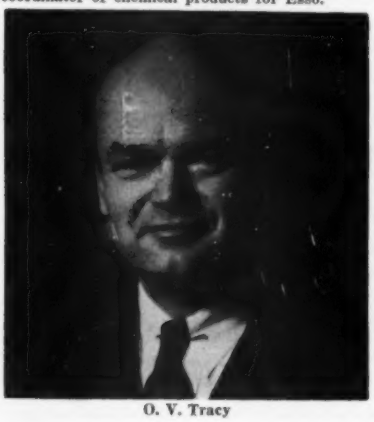
Observance of Oil Progress Week in New Orleans was highlighted by the dedication of Pan-Am Southern Corporation's new headquarters. It marked the 25th anniversary and coincided with the dedication of the company's $25 million refinery at Destrahan, Louisiana. The occasion was marked by the presence of Pan-Am's president, Bruce K. Brown, now serving as deputy administrator of the Petroleum Administration for Defense, members of the board of the parent company, Standard Oil Co. of Indiana and Pan-Am officials and operating staff.

Standard Names Asst. Comptroller

George W. Schwer, a member of the comptroller's department of Standard Oil Co. (N. J.), since 1933, has been appointed assistant comptroller. Mr. Schwer is a graduate of the business administration and accounting department of New York University. He joined the purchasing division of a Jersey Standard affiliate in 1929. Four years later he transferred to the comptroller's department and two years ago was made a staff assistant.

NPA Appointment

Osgood V. Tracy has been appointed deputy director of the National Production Authority's chemical division. Mr. Tracy is on leave as general manager of the chemical products department of Esso Standard Oil Co. For more than 20 years he has been engaged in the commercial development and manufacture of chemicals from petroleum. He formerly was operations head of Standard Oil Development Co., manufacturing coordinator of chemical products for Esso.



O. V. Tracy

Ohio Oil Expansion

The Ohio Oil Co. is spending a record $40 million this year in expansion programs to help meet the nation's rapidly rising demand for petroleum, J. C. Donnell II, president, announced recently. Capital expenditures during the past five years have totaled $128 million for new facilities. Funds for these programs have been provided entirely through capital extinguishments and earnings.

The company is accelerating its exploration efforts in the Rocky Mountain region, and is preparing to drill a 20,000-foot test well in the Paloma field in California. It has acquired substantial acreage in the Williston Basin in eastern Montana and the Dakotas, and has joined with a group to explore nine million acres in Saskatchewan, Canada. Experimental secondary recovery projects in the company's extensive acreage in old Illinois fields indicate that 60 to 70 million additional barrels of oil may be recovered through extensive water-flooding of these fields. Similar projects are being conducted in Kansas and Oklahoma.

The Ohio expansion program includes the construction of a natural gasoline plant in the North Markham and North Bay City fields in Texas designed to process 100 million cubic feet of natural gas per day. The plant will be operated by Ohio under a unitization agreement with another company. Further expansion at the company's Robinson, Ill., refinery will boost its capacity from 30,000 to 40,000 barrels per day, and marketing facilities will be strengthened by the construction of additional products pipe line terminals at Toledo, Ohio, and Mt. Vernon, Ind. Crude lines also are to be extended.

SO Indiana Elects Directors

S. A. Montgomery, assistant general manager, manufacturing department, and A. C. Sailstad, formerly president of the Stanolind Oil Purchasing Company, have been elected directors of Standard Oil Company (Indiana).

Mr. Sailstad has also been appointed general manager, sales department, to fill the vacancy caused by the advancement last week of D. F. Benton to vice-president in charge of sales to succeed R. F. Baity, deceased.

Mr. Montgomery continues in his present position as a manufacturing executive. He joined Standard in 1919 as a chemist at its Wood River, Ill., refinery. After serving as assistant superintendent of the paraffine department, superintendent of the lubricating and paraffine department, and as assistant general superintendent, general superintendent, and manager of the Wood River refinery, he was transferred to the company's Whiting, Ind., refinery as manager in 1942. He was promoted in 1946 to assistant general manager, manufacturing department, in the general office at Chicago.

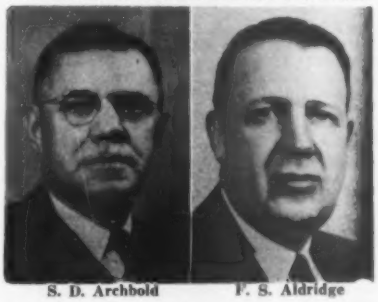
Mr. Sailstad began his career with Standard as a billing clerk in the Duluth, Minn., field in 1924. In February, 1947, he moved to Tulsa, Okla., as assistant general manager of Standard's crude oil purchasing department, and on July 1, 1948, he was made president of the Stanolind Oil Purchasing Company, a Standard subsidiary at Tulsa.

Premiums Offered in Mexico

European oil company representatives in Mexico are offering from ten to 20 percent over world market prices for crude or refined petroleum products as a result of the Iranian shutdown. Seventy percent of Mexico's production of about 6,500,000 barrels a month is sold without competition on the domestic market and 60 percent of the remaining 2,000,000 barrels earmarked for export is sold under long-term contracts with U. S. majors at world market prices. The remaining 800,000 barrels represent Mexico's spot-market supply, which at the moment is the object of spirited bidding.

To complicate the problem further for overseas buyers, owners of small Texas refineries, including the Southwestern Refining Co. of Corpus Christi, are bidding against the Europeans, taking advantage of smaller shipping charges to the nearby Gulf Coast port.

Archbold Heads Esso Inland Marine



S. D. Archbold F. S. Aldridge

Sherman D. Archbold has been appointed general manager of the inland waterways department of Esso Standard Oil. He has been assistant manager of the department since 1945 and succeeds R. G. Kimball, who is retiring after three decades with the company. Fred S. Aldridge, a 35-year service member of the department and presently operations manager, becomes assistant general manager.

A recognized authority on inland marine transportation, Mr. Archbold has conducted many extensive surveys of waterways transportation for the company and its affiliates throughout the world. Among notable results of these studies have been the enlargement of the company's New York Harbor fleet which now handles more than 41 million barrels of petroleum annually, the establishment of the Baton Rouge branch of Esso's waterways activities and the formation of the Mid-Atlantic branch covering the Philadelphia, Baltimore, Norfolk area.

Phillips Wins Chemical Award

Phillips Petroleum Co. will be given the 1951 Award for Chemical Engineering Achievement on November 28 by *Chemical Engineering*. Presentation will be made at a dinner at the Waldorf-Astoria Hotel.

Two inter-related achievements vital to the welfare of the United States and its defense won the award for Phillips: (1) commercial development since 1948 of high abrasion carbon black, and (2) major contributions to the successful development of cold rubber.

An Awards Committee, headed by Alfred H. White, professor-emeritus of chemical engineering at the University of Michigan, Ann Arbor, and comprised of 70 senior chemical engineering educators of the United States, selected Phillips as winner.

Rosecky Heads IDECO's Torrance Plant

J. J. Rosecky has been appointed general manager of the Torrance, Calif., plant of the IDECO Division of Dresser Equipment Co. Before joining IDECO Mr. Rosecky was vice president of manufacturing for the Heil Co. of Milwaukee.

J. J. Rosecky

Delivers Canadian Crude in Michigan

Cleveland Tankers, Inc. has delivered the first cargo of Canadian crude oil, shipped by lake tanker, to an American refinery. The S. S. Comet loaded approximately 32,000 barrels of 33 gravity Canadian Red Water crude oil at the eastern terminus of the Interprovincial Pipe Line Co. and delivered it to the Old Dutch Refining Co. at Muskegon, Mich. Canadian crude delivered by water route compares favorably in price with the delivered cost of Mid-Continent crude oils at Muskegon.

Germany Starts Offshore Drilling

Drilling has begun on Germany's first deep test offshore well at the small island of Helmsand in the North Sea. The derrick is placed atop a steel structure about two miles offshore and the well is to be carried to a depth of about 6,500 feet in the hope that it will connect with the reservoir beds of the Rhaetic west of the Heide saltdome structure.

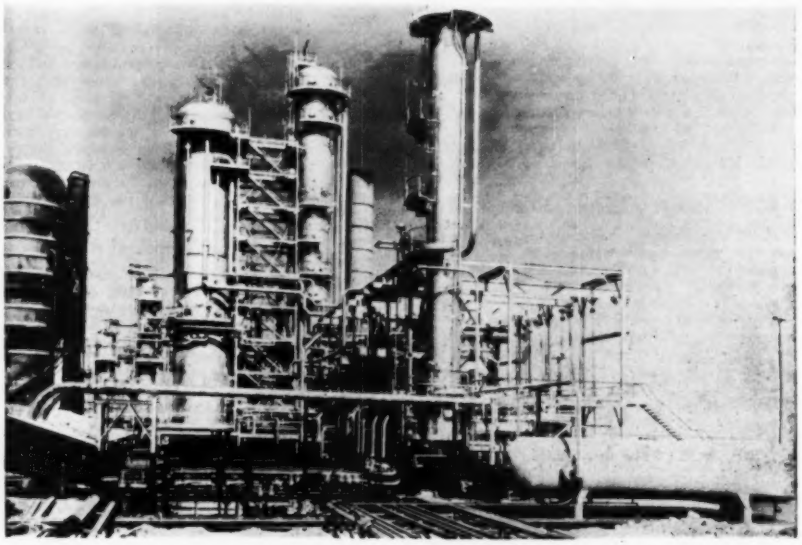
Iranian Official in Mexico

Jawad Khalili, head of the Iran government's oil administration, arrived in Mexico Oct. 3 to look over Mexican installations and seek technicians for service in Persia. An unidentified spokesman within Pemex, the government oil agency, commented that "we do not have too many technicians for our own use. While we went through the same problem Iran is facing, and naturally feel sorry for that country, it is hoped any Mexican technician will think first of his native land before accepting a proposition from foreigners."

Plans O.U. Alumni Chapter in Mexico

Larry Gusseman, of the Latin American Exploration Co., requests all Oklahoma University graduates residing in Mexico to contact him at the oil company's offices, Ejido 7 (Despachos Nos. 101-102), Mexico, D.F. The object is to organize a Mexican chapter of the university's alumni association.

Bahrein Crude Still Runs 72,000 Barrels Daily



Bahrein Petroleum Co. recently completed an eight-month run of a new primary distillation unit during which an average throughput of 72,000 b/d was maintained. The unit was designed by The Lummus Co. and erected by International Bechtel, Inc.

The crude still is a preflash type of distillation unit in which whole crude is first fractionated at a pressure of approximately 60 psig. A light gasoline of from 180° F. to 270° F. end point is taken overhead from the preflash column and routed to a stabilizer within the unit limits for vapor pressure control before going to treating and blending. Two naphtha side cuts are taken from the preflash column and used for gasoline blending, reformer charge, or jet fuel manufacture.

A unique feature of the preflash column is that it includes two flash zones, upper and lower, separated by stripping trays. Crude feed to the preflash heaters is split, the portion entering the lower flash zone being heated to a temperature such as to produce a high percentage of overflash. Vaporized material from this zone strips off light ends contained in the liquid coming down from the upper flash zone, the feed to which has been given only a nominal amount of overflash. Bottoms from the preflash column are fractionated in an atmospheric tower, which produces kerosine and diesel distillates and bottoms for charge to the vacuum unit.

The combination preflash and atmospheric heater is said to be the largest process furnace ever built when considered in terms of heat release on a single setting. The heater is an atmospheric draft design and includes a convection section and steam superheater in addition to end-fired radiant sections.

The crude still was designed for integrated operation with an adjacent vacuum unit, and final tie-ins were made during a scheduled maintenance shutdown of the vacuum unit. The integrated operation of these two units made necessary a thorough study of the heat exchange picture with an eye toward most advantageous use of existing equipment. As a result of this study, it was decided to install steam generating equipment for waste heat recovery.

Vertical thermosiphon type shell and tube units having double tube sheets and "U" tube bundles were provided for steam generation, the heat being supplied by a kerosine stream from the atmospheric fractionator. Bad feed water available in Bahrein leads to heavy scaling, and it is necessary that the units be subjected to a rather severe thermal descaling cycle in operation. The thermal strains encountered in this descaling operation have proved too severe for conventional single tube sheet and floating head equipment to withstand. Hence the "U" tube and double tube sheet construction was decided upon in order to provide satisfactory assurance against leakage either of feed water and dissolved solids into the hydrocarbon stream or of oil into the steam system. Both of these contingencies were considered equally objectionable. This design has so far proved quite successful.

A NOVEL OF THE OIL COUNTRY OF THE GREAT SOUTHWEST

THE BIG PLAY

by Elinor Pryor

Against a background of boom-town color and violence, Brock Catlin fought, gambled and mastered his way through one oil play after another. From the beginning he knew he wanted two things from life: Oil and Billie. Cut from a pattern of ruthless ambition, physical strength and courage — the marks of the true oilman — Brock drilled his wells and made his millions. Billie, vibrant and affectionate, woman enough to make any man's heart pound, was his, too.

"A good novel . . . an extraordinary history of a vast industry's most turbulent years . . . It is vivid reading."
—*N. Y. Herald Tribune Book Review*

"Masculine in its skillful production . . . it rings true from the erection of the derrick and the first spudding-in to the sure-fire high drama of bringing in a well . . . A swift, well-told story of one man's career in oil."—*Chicago Tribune*

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PERU
BOLIVIA
BRAZIL

Other Latin American countries will be reported in the near future, including Mexico. Reports data on wells spudded, status of wells, completions, rigs operating, footage drilled, oil production by operators and by countries.

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Which comes first—
STEEL *or* OIL?

STEEL and oil have become as closely related as the chicken and the egg. Any sizable increase in steel production calls for a like increase in oil producing and refining capacity. More steel means more machines, ships, locomotives, trucks, planes and a myriad of other steel products that need fuels and lubricants. And that will take more steel to drill wells and to build pipe lines and refineries.

New steel plants and refineries are both "first" at McKee—and both in a hurry. McKee maintains separate divisions for iron and steel plant and petroleum refinery design, engineering and construction. The combined technical knowledge and experience of these two divisions are particularly advantageous to McKee clients in the present expansion program.

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Taxation's Threat to Industry

(Continued from page 61)

of the heaviest taxes are levied by the federal government on earnings and capital stock. Too, such items as federal imposts on safety box rentals, foreign insurance policies, telegraph, radio and cable messages, and even the 20 percent levy on electric light bulbs, all increase the weight of the heavy federal tax burden carried by the industry.

Special levies on pipe lines and transportation generally, plus heavy payments for automotive transportation, turn petroleum operations into a maze of tax bookkeeping, a maze encompassing drilling permits, inspection fees, stock transfers, sales taxes, curb cut levies, pump taxes, business licenses and a welter of special assessments. This entire industry tax bill now touches nearly four billion dollars a year. How far will it go?

A seventeenth century writer, quite well aware 300 years ago of the tricks of the tax collectors, described their trade in these words:

"The art of taxation consists in so plucking the goose as to obtain the largest amount of feathers with the least possible amount of hissing."

Perhaps in those monarchy-ridden years the taxpayer was as defenseless as a goose. But the progress the world has made in the past three centuries has given the modern taxpayer a little more means of defense through democracy The question today is not, "*Can* the taxpayer defend himself?" but rather, "*Will* the taxpayer defend himself?"

Pemex Drilling Contract

Gordon Duke, president of the Southeastern Oil Co. of Jacksonville, Florida, who has been trying to arrange a drilling contract with Pemex for the past three years, is reported to have finally gotten his "final proposed contract" for a Mexican operation under consideration by the government oil agency's officials. The proposed contract is said to differ from the usual percentage-of-production arrangement in that it is a cost-plus deal granting Duke the right to export Mexican crude to the United States.

Mexico Exports Sulfur

Sulfur being produced at Poza Rica is filling Mexico's domestic demand, according to a Pemex spokesman, who added the first lot for exportation is already on its way. He did not identify the purchaser of the 2,000-ton shipment. Two additional sulfur units now being installed in Mexico by Phillips Petroleum Co. will not produce sulfur but will be used to sweeten gas for commercial use.

Oil for Today . . . and Tomorrow

5,000 cubic feet = 1 barrel

Every 5,000 cubic feet of natural gas consumed by Mexican industry frees one barrel of oil for domestic use or export.

Mexico has available gas reserves of 1.7 trillion cubic feet . . . or the calorific equivalent of a third of a billion barrels of oil.

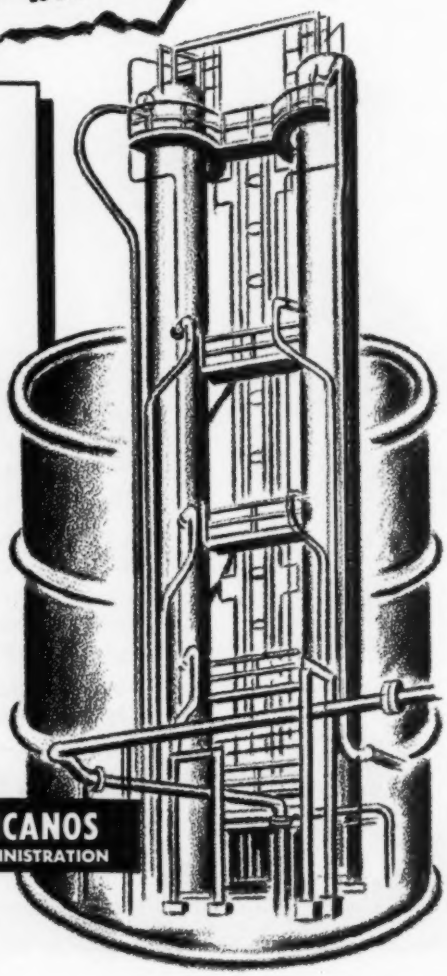
Only since 1948 has this tremendous resource been put to work.

Now operating: the Poza Rica—Mexico City natural gas pipeline; the Roma—Monterrey line, Reynosa—Monterrey line, the Mision-Camargo-Roma line, the Mision-Reynosa-Brasil-Matamoros line — with a combined daily capacity of 360 million cubic feet.

Under construction: the Monterrey-Torreon line with a daily capacity of 100 million cubic feet.

Construction programmed: the Brasil-Tampico-Poza Rica line with a capacity of 100 million cubic feet daily.

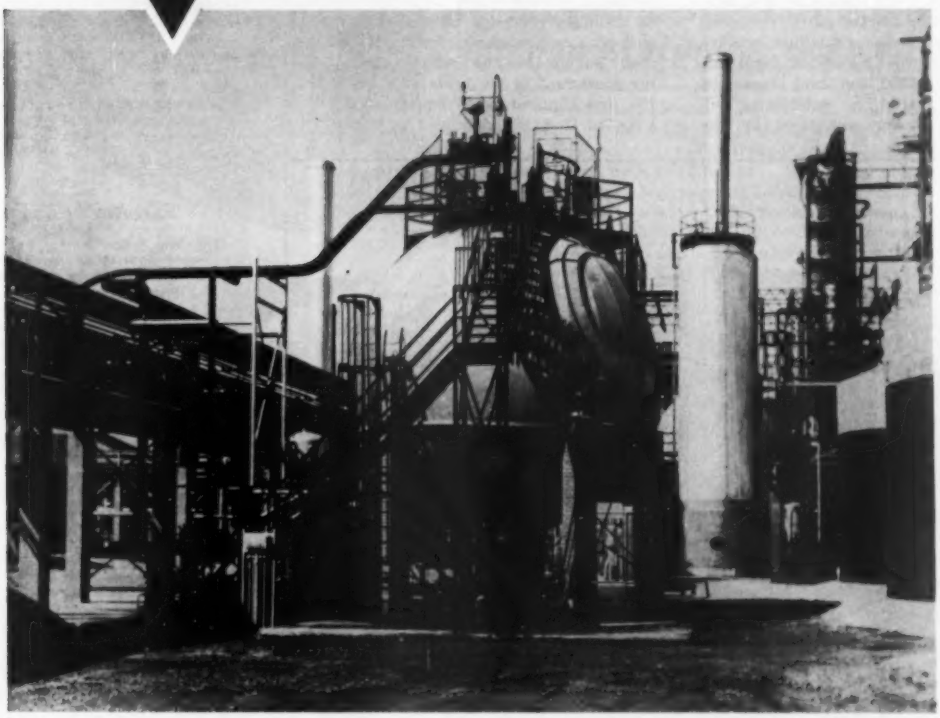
Mexico's new natural gas industry is an important ally of Mexican oil development . . . providing an important fuel in its own right . . . contributing also to the availability of more oil for today and tomorrow.



PETROLEOS MEXICANOS
MEXICAN PETROLEUM ADMINISTRATION

CONOCO

another leading refiner who desalts with PETRECO



CONTINENTAL OIL COMPANY is now using Petreco Desalting in four different refineries—New Mexico, Oklahoma, Texas and Louisiana. Four successive installations by a refining organization with Conoco's established reputation is ample evidence that Petreco Desalting proved itself once for Conoco, and has continued to do so with each successive installation. If you want the best in salt removal performance, specify Petreco and be assured of

Minimum Residual Salts and Solids
Reduced Furnace Plugging
Maximum Exchanger Efficiency
Reduced Corrosion in Topping Section
Savings in Salvaged Waste Oil
Consistently Clear Water Bleed
Trouble-free Automatic Operation

PETRECO OFFERS COMPLETE DESALTING SERVICE AND FACILITIES

PETROLEUM RECTIFYING COMPANY
3202 So. Wayside Dr., Houston 3, Texas
1390 E. Burnett St., Long Beach 6, Calif.

PETRECO

SPECIALIZED Electric PETROLEUM PROCESSES { DESALTING / DEHYDRATING

PR 51-2

Brazil's Council Reports

(Continued from page 109)

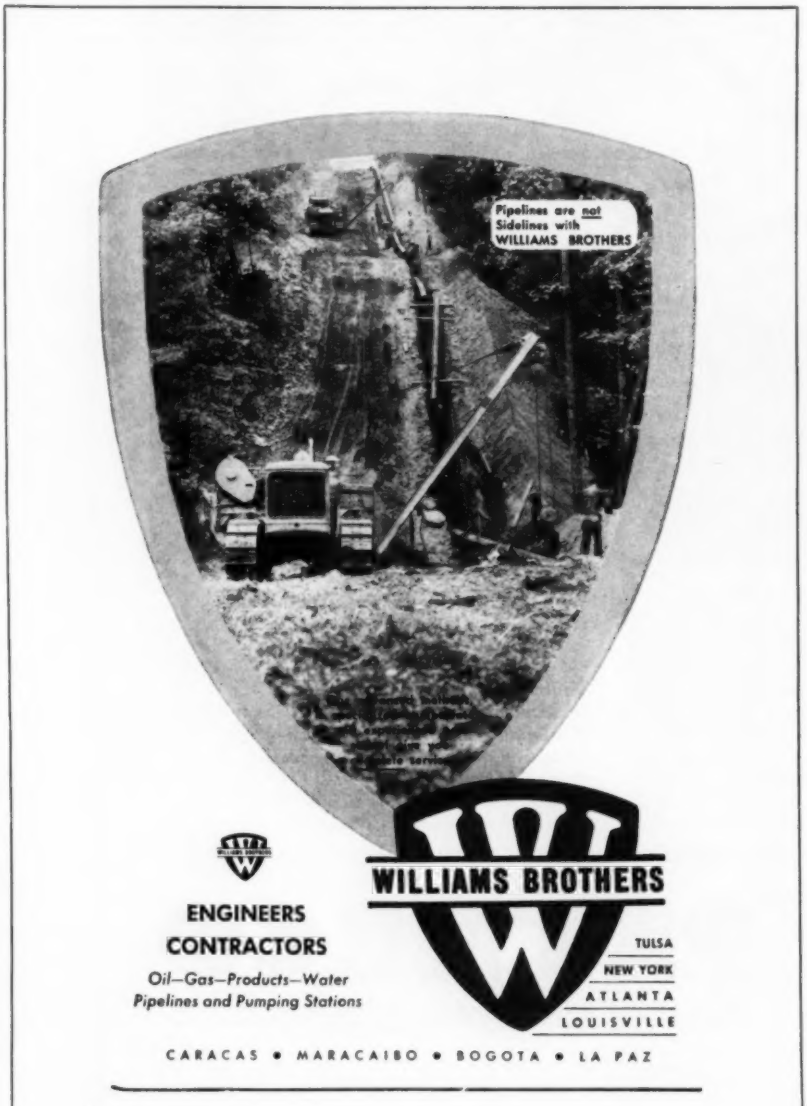
number by catalytic polymerization and liquefied gas.

As regards the 10,000 and 20,000-barrel refineries to be erected in the Federal District and San Paulo respectively, the concessionaires were granted an extension of two years from January 1, 1951, to complete the work, subject to the condition that the contracts for financing and building the refineries be signed within 120 days from that date.

The project being carried out by Williams Brothers for a system of pipe lines between the port of Santos and the city of San Paulo was undertaken in 1950, and work progressed well during the year. The undertaking will be administered under concession by the state-owned Santos-Jundiai Railway. The pipe line, originally destined for imported products, will also feed crude to Cubatao and carry the produce of the refinery.

In 1950 a 16,000-ton tank ship was acquired, and contracts were signed for the building of 11 large and nine small tankers with a total tonnage of 207,000. The small ships are now steaming to Brazil and the others must be delivered by June 1952.

The Council, under its agreement with DeGolyer & MacNaughten for the technical supervision of prospecting activities, continues to maintain contracts with various foreign geologists and companies for specialized services. During 1950 the Council imported drilling equipment to the value of U. S. $2,032,137, and acquired locally sundry materials at a cost of U. S. $931,535.



Book Review

Life and Death of an Oilman, by Joseph John Mathews, published 1951 by University of Oklahoma Press, Norman, Okla., 259 pages, $3.75.

The oilman whose life and death are recorded in this book was Ernest Whitworth Marland (1874-1941) who was a colorful figure in petroleum during the first quarter of the 20th century and made and lost fortunes in oil in West Virginia and Oklahoma. As his biographer pictures him, here was a man who was the equal of giants like Jay Gould, Cornelius Vanderbilt, Andrew Mellon and the elder Rockefeller in energy, dreaming, cleverness and acquisitive capacity. But his ruthlessness was vitiated by the fact that he was born a gentleman, and was both a humanitarian and a devotee of pleasure and display, with political ambitions on the side (he was once governor of Oklahoma). With these qualities he went through cycles of dazzling success and dismal failure. The story is an exciting account of a lurid phase of the history of southwestern oil, and a searching character analysis of one of the most flamboyant personalities of this history.

Pan-Am To Build Coker

The first major unit for production of coke from petroleum crude oil in the Gulf Coast area will be constructed by Pan-Am Southern Corp. at its Destrehan refinery. The unit will produce each month about 20 million pounds of coke. The Lummus Co. will design and build the coker.

Work will start within a few weeks on the unit. The coker is in addition to the multi-million dollar construction project which began last month at Destrehan. Pan-Am is already building a catalytic cracking unit, fluid hydroformer, alkylation unit and vapor recovery unit at Destrehan. The coker will be designed so as to process either heavy crude oil or the bottoms from an adjacent refining unit processing light crude. The facilities will charge approximately 9,000 barrels daily.

Last year Pan-Am completed a similar unit at El Dorado, Ark. With both Destrehan and El Dorado cokers working, Pan-Am will be turning out about five percent of the nation's supply of petroleum coke.

New West Texas Pipe Line

Westinghouse Electric Corp. will supply approximately $1,160,000 worth of electrical equipment for a new 550-mile, 300,000-barrel pipe line from West Texas fields to refineries and pipe line connections in the southern and eastern parts of the state. The 26-inch line originates at Colorado City, and at Wortham the system will divide into a 114-mile, 20-inch line to Longview, and a 164-mile, 24-inch line to Lucas, near Beaumont.

The pipe line will employ motors for centrifugal pump drives, with centralized control. It will feature remote tank farm and pump manifold controls, and one of them will control more than 100 valves and 11 booster pumps. Gulf Oil Corp. is designing and building the line.

Protective Lighting Booklet

Complete plans for outdoor industrial lighting are provided in a new 24-page booklet, Light for Plant Safety and Security, available from the Westinghouse Electric Corp. Application suggestions and techniques are given, such as the lighting of isolated fence boundaries, building-face boundaries, water front boundaries, and industrial thoroughfares. Various power distribution and control systems and mounting methods are provided. For a copy of booklet B-4791, write the Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Sunray Operates Rock Island Plant

Sunray Oil Corp. has begun processing 7,000 barrels of crude daily at the former Rock Island refinery leased by Sunray here as an adjunct to its catalytic cracking operations at Duncan. Total crude oil throughput from the combined plants is approximately 30,000 b/d.

For ALL your pressure control needs YOU CAN DEPEND ON SHAFFER!

For well over a quarter of a century, the Shaffer name has meant continued leadership in dependable equipment to meet all types of pressure control problems . . . on wells of all depths . . . under the widely-varying operating conditions of the oil industry. Leading operators prefer Shaffer equipment, not only because it represents the utmost in rugged dependability—*but also because they gain so many other vital advantages —in greater compactness, greater adaptability, greater operating simplicity and ease of installation—when they standardize on Shaffer equipment.* Here are a few typical examples . . .

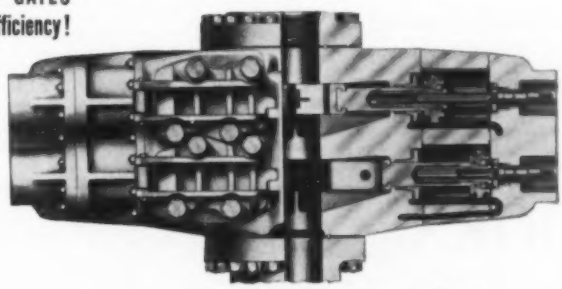
SHAFFER HYDRAULIC CELLAR CONTROL GATES

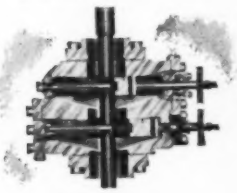
. . . Revolutionary in compactness, simplicity, efficiency!

Available in both Double (illustrated right) and Single types. Both types are amazingly compact—Double type only 30" high, Single type only 18½" high, even in sizes as large as 13⅝" (12" Series 900).

Rams are changed by simply opening side doors, replacing rams, then closing and bolting the doors. *And rams can be changed whether pipe is in or out of the hole!*

With all moving parts completely enclosed, this Gate is ideal for *all* drilling operations. There are many other important advancements built into this Gate, so be sure to get the complete story before you invest in *any* control gate equipment. Available in a complete range of sizes and pressure ratings!





SHAFFER MECHANICAL CELLAR CONTROL GATES

- Available in both Double (illustrated above) and Single types for operation by air, electric or steam drive —*plus complete manual stand-by operation!*
- Require minimum space—less than 29" for Double, 19" for Single, even in sizes as large as 13⅝" (12" Series 900).
- Self-Draining Ram Compartments, with no place for detrimental mud to accumulate and interfere with free ram travel . . . Quick, Easy Ram Changes by simply removing *one* end cover . . . and many other unique features make these gates outstanding in their field.

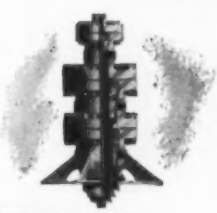
Domestic or overseas, wherever your operations call for mechanically-operated cellar control gates, Shaffer has the most advanced design available!

SHAFFER COMBINATION ROTATING BLOWOUT PREVENTERS AND STRIPPERS

—Combine in One Unit Every Necessary Feature for Complete Pressure Control While Drilling.

- Can be used with *any* standard kelly —square, hexagonal or octagonal, any type drill pipe—coupled, upset or flush. No special strings or equipment needed!
- Maintains continuous seal around pipe, couplings, tool joints, upsets, subs, drill collars, etc. *automatically* —whether string is rotating, being raised, lowered, or is stationary.
- Quick Releasing Bonnet permits lifting bits, reamers, other large-diameter tools through the unit quickly, easily.

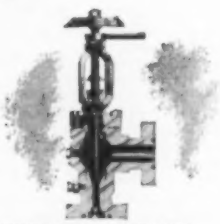
. . . and many other unique features! Nothing equals this unit for maintaining complete pressure control while the drill string is in the well. Available in a complete range of sizes.



SHAFFER LANDING HEADS AND TUBING HEADS

—Meet Every Requirement for Modern Compact Casing and Tubing Suspensions The World Over.

- Available in various types and packing arrangements. Base Heads and Combination Base, Casing and Tubing Heads are available for combining several units into one where space is at a premium.
- Shaffer provides a full line of modern Tubing Heads, Multiple Zone Hook-Ups and other equipment to complete your pressure control installation—for conditions anywhere in the world!



SHAFFER ADJUSTABLE FLOW BEANS

—The Pioneer Adjustable Flow Bean that Provides Operating Features Unequalled By Any Other Equipment.

- Available with Conical, Micro and electrically-heated Thermo Tips in both regular and hard metal designs to meet various drilling, production and refinery applications. All popular sizes—in both flanged or screwed connections—to meet your particular requirements.

ALSO, SHAFFER FISHING TOOLS!

In addition to pressure control equipment, Shaffer also provides one of the most complete lines of dependable fishing tools in the industry. Not only all conventional types—but many tools that are unique in operation and purpose. Write for complete information!

Send for your free copy of the new 1951 Shaffer Catalog. See pages 4525 to 4600 of your 1951 Composite Catalog for additional Shaffer data.

Ethyl Salutes Dealers

A nationwide salute to the service station dealers of America is the keynote of a special Oil Progress Week program being sponsored by Ethyl Corp. Pointing to the many public services they perform in the course of their daily work, Ethyl's nationwide tribute honors service station operators as a vital force in American community life.

While Ethyl's tribute to service station dealers is nationwide in scope, it is being carried out almost entirely on the community level. To this end, thousands of communities are using the occasion to honor their local service station men, with Chamber of Commerce, local merchants, American Legion posts, and other organizations joining in a salute to the dealers of their home towns. The local programs are being backed by special advertisements in the *Saturday Evening Post*, *Life*, *Look* and *Collier's*.

Awarded Deep Rock Contract

Harold Bottomley, vice president in charge of sales for the Refinery Engineering Co. of Tulsa, announces his company has been awarded a contract by the Deep Rock Oil Corp. for site preparation and installation of various auxiliary equipment in connection with the lube oil expansion program at Cushing, Okla. The contract includes the installation of a 3,500 gpm cooling tower with pumps and piping, revamping of electrical facilities, the addition of numerous product lines and the extension of the present fire protection system.

Forms Supply Company

Socony-Vacuum Overseas Supply Co. has been organized to centralize the handling of several aspects of Socony-Vacuum's eastern hemisphere operations which are now divided among various departments of the parent company. It will have approximately 90 employees. Robert Siegel has been named president. Headquarters will be at Fort Lee, New Jersey.

Gulf X-Ray Diffraction School

I. H. Milne (center), Gulf Research & Development Co., and O. E. Robbins (left), Shell Oil Co., listen as C. J. Woods, research and control instrument division, North American Philips Co., Inc., explains the operation of a wide-range goniometer at the eleventh semi-annual X-ray diffraction school held at the company's plant in Mount Vernon, N. Y. during the week of Oct. 8. Over 100 scientists and technical men from industry attended.

Deep Rock Sells Marketing Properties

Deep Rock Oil Corp. has completed its two year program of withdrawing from all direct marketing operations. Its last marketing properties, those in Chicago metropolitan area, have been sold to the Great American Oil Co., a Deep Rock distributor, headed by B. L. "Barney" Majewski. Mr. Majewski will continue as a Deep Rock director but has resigned as vice president. The company's independent jobber organization numbering upwards of 400 now sells Deep Rock products in the states of Illinois, Indiana, Iowa, Minnesota, Nebraska, Oklahoma, North Dakota, South Dakota and Wisconsin.

Butadiene Catalyst

The Davison Chemical Corp. has contracted with the Office of Rubber Reserve to produce a tantala-silica gel catalyst for deriving butadiene from ethyl alcohol and acetaldehyde. In the current program, it is estimated that over 20 percent of the butadiene will be from alcohol. In the process, ethyl alcohol is mixed with acetaldehyde, which is obtained by dehydrogenation of ethyl alcohol. The mixture is passed over the tantala-silica gel catalyst to form butadiene and by-products such as hydrocarbons, aldehydes, ketones, esters, ethers and alcohols. The catalyst is two percent tantalum pentoxide and 98 percent silica gel. The gel in the catalyst is used for the condensation of acetaldehyde to crotonaldehyde. The crotonaldehyde is an intermediate product which is reduced to butadiene by the tantala in the catalyst, with the ethanol acting as a hydrogen donor.

Mud Additives Book

A special bulletin of the American Petroleum Institute's division of production, "The Effects of Drilling-Mud Additives on Oil-Well Cements," is off the press. The report contains 40 pages, including 265 tables and charts, summarizing the data obtained from a series of cooperative tests conducted by the study committee to determine the effect of several drilling-mud treating chemicals on the thickening time and strength of three types of commercial cement commonly used in oil-well cementing operations. The bulletin, which is designated D-4, is available at $1.00 a copy from the Institute's Division of Production, 816 Rio Grande National Building, Dallas 2, Texas.

Spirax Correction

The steam separator illustrating the Spirax Manufacturing Company's Letter No. 8 on page 70 of September WORLD PETROLEUM was incorrectly positioned and should be given a quarter turn in a counter-clockwise direction to put it in proper working position.

BOOKS

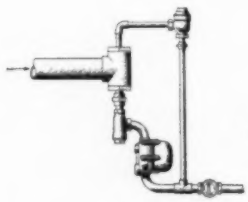
PRACTICAL OIL GEOLOGY—Dorsey Hager	$ 4.00
PRACTICE OF LUBRICATION—T. G. Thomsen	$ 8.00
PETROLEUM PRODUCTION ENGINEERING — L. C. Uren "Oil Field Development"	$ 7.50
PETROLEUM PRODUCTION ENGINEERING — L. C. Uren "Oil Field Exploitation"	$ 7.00
PETROLEUM PRODUCTION ENGINEERING — L. C. Uren "Petroleum Production Economics"	$ 7.50
PETROLEUM REFINERY ENGINEERING—N. L. Nelson	$ 9.00
PETROLEUM PRODUCTION (5 Volumes)—Park J. Jones	
Vol. I—Mechanics of Production: Oil, Condensate and Natural Gas, 1946	$ 5.00
Vol. II—The Optimum Rate of Production, 1946	$ 5.00
Vol. III—Oil Production by Water, 1947	$ 5.50
Vol. IV—Condensate Production and Cycling, 1948	$ 5.50
Vol. V—Oil Production by Gas & Flooding, 1948	$ 6.00
PRINCIPLES OF PETROLEUM GEOLOGY—Wm. L. Russell	$ 7.00
PRINCIPLES OF SEDIMENTATION—2nd Edition—W. H. Twenhofel	$ 6.50
PETROLEUM CHEMICALS INDUSTRY—Richard Frank Goldstein	$ 8.50
ROTARY DRILLING HANDBOOK—4th Edition—Brantly	$ 7.50
SAFETY IN PETROLEUM REFINING & RELATED INDUSTRIES—George Armistead, Jr.	$10.00
THE SCIENCE OF PETROLEUM, Vol. 5, Pt. I, Crude Oils —Benjamin T. Brooks and A. E. Dunston	$11.00
STRUCTURAL GEOLOGY OF NORTH AMERICA—A. J. Eardley	$12.50
THEORY AND PRACTICE OF INDUSTRIAL RESEARCH —David Bendel Hertz	$ 5.50
WORLD GEOGRAPHY OF PETROLEUM—edited by Wallace E. Pratt and Dorothy Good	$ 7.50

TO ORDER WRITE TO

Book Dept. World Petroleum

2 W. 45TH ST. NEW YORK 19, N. Y.

SPIRAX LETTERS—NO. 10



Air in the mains

Air in the steam spaces of process plant is a serious hindrance to production. The air gets in when steam is off; leaking in through glands and joints and traps.

But air and gases are also brought in with the steam. The gases enter the boilers with the feed water and most or all of them are carried over with the steam into the mains.

Later notes will deal with the universal problem of the effect of air on steam temperature and heat transfer in the process steam spaces. At the present stage we make the sensible decision to release the air from the mains, so that the heat can be got round the system quicker (a good thing at any time but especially good for Monday morning starts) and so that we will not add needlessly to the air already in the process equipment by feeding more air and gases with the steam.

There can be a strong case for de-aeration or de-gassing plant at the boilers. The ready alternative is to evacuate the air and gases from the steam mains through Thermostatic Air Vents fitted at carefully chosen points. One of them can be usefully combined with the drainage installation at each terminal end (as in the picture).

Drawing T. 125 shows suggested arrangements; and you will perhaps like to have also Information Sheet No. 10, "Air in Steam Spaces." Please use the request slip.

Each of these Spirax Letters aims to give useful information on some aspect of steam plant management. The complete series is an aide memoire on efficient steam utilisation for process and heating. Back numbers are available.

SPIRAX HEAT TRANSFER

SPIRAX MANUFACTURING CO. LTD., CHELTENHAM, ENGLAND

Phone: Cheltenham 5175-6 Grams: Spirax Cheltenham

LONDON OFFICE: 28 Victoria St., S.W.1. *Abbey 6101-3832*

CUT ALONG THIS LINE FOR FILING

REQUEST SLIP FOR FURTHER INFORMATION

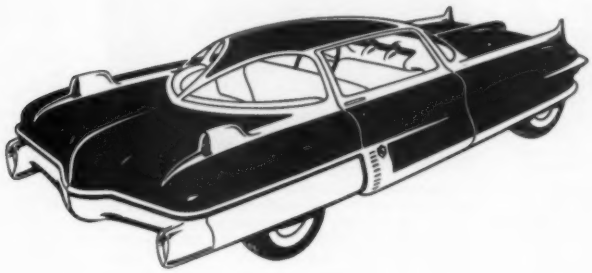
Please send Drawing T. 125 and a copy of Information Sheet No. 10 on "Air in Steam Spaces."

NAME .....

ADDRESS .....

PET 1151

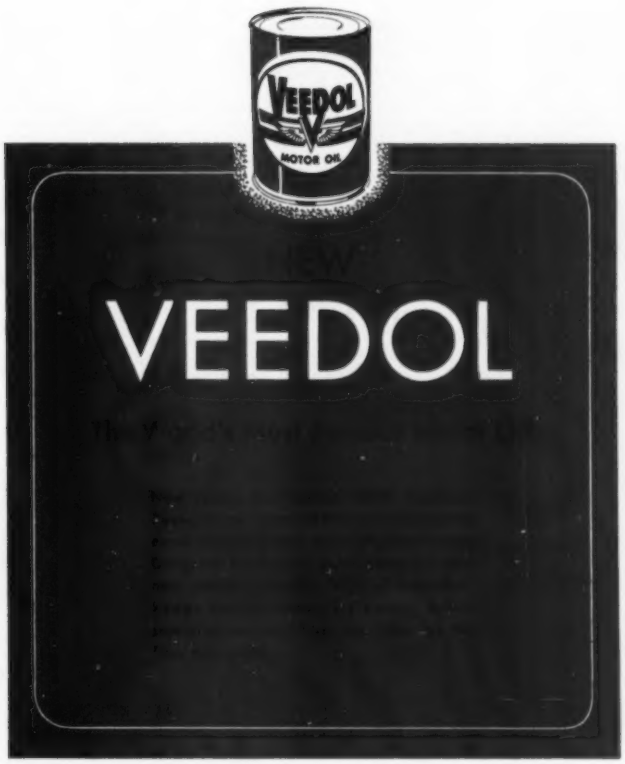
Jet-Flow Sedan designed by Richard Arbib for the VEEDOL "Dream Car" Salon.



FOUND

WHEREVER FINE CARS

TRAVEL



TIDE WATER ASSOCIATED OIL COMPANY

NEW YORK · TULSA · SAN FRANCISCO

World Commerce to Represent Houdry

Houdry Process Corp. has completed arrangements with World Commerce Corp. S.A. under which World Commerce will represent Houdry in negotiating foreign process licenses throughout the world. Arrangements between the two companies will make available refinery engineering and design services and the facilities of the Houdry laboratories at Linwood, Pa. In addition, Houdry will make available consulting engineering, construction, and technical services.

This new Houdry-World Commerce agreement coincides with observance by Houdry of its 20th anniversary year in catalytic cracking of petroleum. The world's first commercially successful petroleum catalytic cracking plant, a Houdry fixed-bed unit, went on stream in 1936 and thereby revolutionized the petroleum industry. Catalytic cracking facilities representing an investment of approximately one billion dollars have since been installed or are now in the engineering or construction stage.

World Commerce Corp. was formed at the close of World War II by an American-Canadian-British banking group, and was primarily created to bridge the gap between currency exchange shortages and the world's industrial needs. Principal American office is at 25 Broad St., New York, and other offices are maintained in Panama, Paris, Madrid, Frankfurt, Milan, London, Zurich, Tokyo and Rio de Janeiro as well as in Canada.

Kerr Heads NPA Valve Branch

A. J. Kerr, vice president of meter and valve sales for Rockwell Manufacturing Co., has been appointed chief of the valves and fittings branch, general components division of the National Production Authority. He will work under the direction of Eugene S. McCarthy, director of the general components division. Charles W. Burrage, whom he succeeds, is returning to his job at The Lunkenheimer Co., Cincinnati, Ohio.

Long Distance Travelers

The accompanying photograph of Carey O'Connor and his father, John B. O'Connor, executive vice president of Dresser Industries Inc., was snapped at the annual convention of American Association of Oilwell Drilling Contractors, held at Fort Worth, Texas, last month. Carey O'Connor was credited with making a longer journey than any other delegate for the purpose of attending the meeting, with a continuous 29-hour flight from Rio de Janeiro via New York to Texas, a distance of roundly 5,000 miles. He is engaged in business in Rio in association with Cel Heitoro Pedroso as Brazilian representative of Hydrocarbon Research, Inc. and of several members of the Dresser Industries group. John B. O'Connor, shown with his son, undoubtedly holds the long distance record for air travel among company executives.

Building New Ohio Line

Construction of the final portion of the Ohio Oil Company's "big inch" crude oil pipe line between Wood River, Ill., and Lima, Ohio, began in October, O. F. Moore, manager of the company's pipe line department, has announced. It is expected to be completed and ready for use early in 1952. The 22-inch line from Martinsville to Lima will have a potential capacity of 250,000 barrels per day. The new pipe line will be the only big inch crude oil line between Wood River and Lima.

To Enlarge Philadelphia Plant

Gulf Oil Corp. will increase the capacity of its Philadelphia refinery by 75 percent as part of its $200 million expansion program. The company will have spent more than $1,000 million since the close of the war when the program is complete. This is 60 percent more than net earnings for the period.

A feature of the Philadelphia expansion will be the construction of a 125,000-barrel crude still, and a 63,000 barrel catalytic cracking unit. Both will be the largest units of their kind in the world.

Also to be built is a 10,000-barrel per day catalytic reforming unit capable of making benzene, toluene and xylenes. This will be the first installation of its kind to be built by Gulf. Another refining unit to be installed is a 40,000-barrel per day gasoline treating plant.

A new power plant will be constructed with a steam generation capacity of 900,000 pounds and a power capacity of 30,000 kilowatts. An office building along with new worker's locker buildings, a refinery laboratory and a new canteen will complete the new installations. Completion of the construction is scheduled for early 1953.

Baton Rouge Refinery Expansion

Esso Standard Oil Co. plans to spend more than $35 million for new construction at its Baton Rouge refinery, H. J. Voorhies, general manager of the refinery, has announced. The project will increase the refinery's capacity from 240,000 to 270,000 barrels of crude oil daily and expand its chemical operations. Construction will begin immediately and is expected to take about two years for completion. Expanded facilities will include new distillation equipment, expansion of fluid catalytic cracking, additional equipment for producing ethylene, benzene, butadiene and other chemicals for aviation gasoline and alcohols. When the present project is completed the plant's capacity will be twice its wartime throughput of 135,000 barrels a day.

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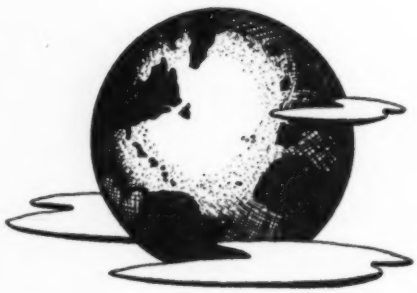
..unique in its function and scope

..available to the Petroleum Industry throughout the world

Oil Properties Consultants, Inc. offers the petroleum industry a complete consulting, geological and engineering service. This service includes the subjects of surface geology, either regional or detailed . . . mineralogical, petrographical and paleontological studies . . . correlation studies employing micropaleontology, logging data, D.T.A. (Differential Thermal Analysis), radioactivity, core analysis, P.V.T. . . . sub-surface, reservoir and structural studies . . . reserve estimates, potential of recoverable oil and gas under various proposed production programs, secondary recovery studies . . . and the rendering of appraisals.

The knowledge and complete laboratory facilities to carry on these services is available to the industry on a world-wide basis to help you attain maximum efficiency and economy in the exploitation of oil reserves.



Oil Properties Consultants, Inc.

709 S. Fair Oaks Ave., Pasadena 2, California

Cable Address - PEACO

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Petroleum Industry Consultants, C. A.
Edificio Carabobo, Caracas, Venezuela
Cable Address PETICON

Courtesy Call Only

Visits of Iranian government officials to Petroleos Mexicanos were described by Pemex director-general Antonio J. Bermudez as strictly courtesy calls. He added that the Mexican government is not involved in any negotiations to aid Iran with her oil problems.

Senator Bermudez further clarified the Mexican-Iranian relationship, which was played up extensively by the Mexican press prior to his statement, by telling reporters that if in the future the Iranians decide to discuss the possibility of Mexican technicians going to the aid of Iran, they should discuss the matter with President Miguel Aleman or with the Foreign Relations Ministry.

New Fuel Additive

A new fuel oil additive which virtually eliminates filter screen clogging in domestic fuel oil burners is now being marketed by Shell Chemical Corp., according to L. V. Steck, vice president. The new product, Ionad 17, will reduce diesel engine maintenance costs due to clogged screens and fouled fuel-injector parts.

Timken Promotes Humphrey

The Timken Roller Bearing Co. has appointed George T. Humphrey, Jr., assistant general manager of the service sales division. Mr. Humphrey was instrumental in developing Timken distribution centers in Mexico, and in promoting Timken rock bit sales in that country. He assumed his new duties at the Canton office on November 1.

White Heads Price Somastic Department

R. P. White, veteran Gulf Coast Somastic manager for the H. C. Price Co., has been named manager of the company's coating operations in the 37 states east of the Rocky Mountains to succeed E. Rowland English, who left the company to join Pipe Protection Service, Inc.

Bituminous Schists of Brazil

The Commission for the Industrialization of Bituminous Schists is examining a draft contract with Foster-Wheeler Corp. for the project and construction of plant to refine 10,000 barrels of shale oil daily. The cost is provisionally estimated at U. S. $38,500,000.

The National Petroleum Council is prospecting an area of 77 square miles, situated between Quiririm, south of Taubate, and Roseira, north of Pindamonhanga, where the bituminous layer is 35 meters thick and the reserves of shale oil are calculated at 2,000 million barrels.

Provision is made in the contract for 40 percent of ordinary gasoline, 20 percent diesel oil and 40 percent fuel oil. Samples of the deposit are being analyzed in the United States and will be also submitted for examination in Sweden. It is hoped to complete examination of the entire region between Quiririm and Roseira before the end of the year.

The Governor of the State of Parana has applied to the Legislative Assembly for a credit, equivalent to U. S. $550,000, to install experimental plant for the extraction of shale oil from the bituminous schists in that state. These deposits extend from north to south for a distance of 250 miles and, according to the Governor's message, are estimated at 200 million tons. Part of the necessary equipment has already been acquired.

Shell to Build Sulfur Plant

Shell Chemical Corp. will build a sulfur recovery plant at Houston to process sour gas from Shell's refinery at that point. The plant will have a capacity of about 35 tons daily. Completion is planned for mid-1952.

Opens Consulting Office

Robert W. Harrison has opened consulting petroleum engineering and geological offices in the City National Bank Bldg., Houston. He formerly was associated with the R. B. Mitchell Co. at Houston.

Halliburton Promotes Peterson

Halliburton Oil Well Cementing Co. has advanced J. P. Peterson from eastern credit manager to assistant general credit manager. The new credit position brings Mr. Peterson from Flora, Illinois, to Halliburton's Duncan, Oklahoma, headquarters. Announcing the promotion, Clint Roberts, Halliburton's credit manager, said that Lester S. Dunlevy, who has been fieldman at Halliburton's Olney, Illinois, camp, assumes Mr. Peterson's former position of eastern credit manager.

Furfural Plant Executive Promoted

Robert K. Fincher has been appointed assistant general manager of the Memphis chemical plant of The Quaker Oats Co. He has been acting assistant plant manager since July 1. The Memphis plant produces furfural for refining of lubricating oils, processing of diesel fuel and refining of butadiene for the production of synthetic rubber.

Crawler Catalog

A 24-page two-color catalog recently released by International Harvester Export Company describes the many features of the International TD-14A diesel crawler tractor. Action shots, colored machine views, and specification charts illustrate the catalog, E-78-A, which is available in English upon request from International Harvester Export Company, 180 North Michigan Avenue, Chicago 1, U. S. A.

Ultrasonic Testing

Sperry Products, Inc., has developed a testing service for the oil refining industry which is available for field testing of pressure vessels, piping and other equipment. The ultrasonic method of test indicates thickness of metal walls and reveals defects. Bulletin 50-115 has been published to describe the services.

BOOKS

PRACTICAL ACCOUNTING FOR OIL PRODUCERS—Robert William Pritcher	$ 9.50
ALKYLATION OF ALKANES—Gustav Egloff & George Hulla	$22.50
BOOKS ON SYNTHETIC FUELS, VOL. I—Bureau of Mines, Pittsburgh	$12.50
AMERICAN OIL OPERATIONS ABROAD—Leonard Fanning	$ 5.00
CORROSION HANDBOOK—Herbert H. Uhlig	$12.00
CHEMISTRY OF PETROLEUM DERIVATIVES—Carleton Ellis	
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Vol. II	$22.50
CONVERSION OF PETROLEUM—A. N. Sachanen	$12.50
CHEMICAL REFINING OF PETROLEUM—V. Kalichevsky & Stagner	$ 8.25
CHEMICAL ENGINEERS' HANDBOOK—John H. Perry (revised 3rd edition, 1950)	$15.00
CORROSION (Causes and Preventions)—Frank N. Speller	$ 7.00
THE CHEMICAL PROCESS INDUSTRIES—R. N. Shreve	$ 9.00
CHEMICAL ENGINEERING ECONOMICS—C. Tyler	$ 4.00
CHEMICAL ENGINEERING PLANT DESIGN—F. Vilbrandt	$ 6.25
CHEMICAL TECHNOLOGY OF PETROLEUM—Cruse and Stevens	$ 8.50
THE SCIENCE OF PETROLEUM VOL. V—Part I CRUDE OILS—Chemical and Physical Properties A. E. Dunstan	$11.00
DISRUPTED STRATA—M. H. Haddock	$ 4.25
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ELEMENTS OF FRACTIONAL DISTILLATION—Robinson & Gilliland (4th Edition)	$ 7.00
EMULSIONS & FOAMS—Berkman & Egloff	$12.00
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ECA To Finance French Plants

Dollar cost of two French catalytic cracking plants will be financed by the Economic Cooperation Administration. Included are a 6,000-barrel catalytic cracking unit at the Donges refinery near Bordeaux and an 8,000-barrel unit at the Shell-Berre refinery near Marseille. Upon completion of this program, France will have available catalytic cracking installations with a capacity of approximately 50,000 barrels per day.

ECA has agreed to contribute $570,000 toward financing the Donges refinery. Of this amount, $400,000 will be in payment of engineering fees and $170,000 in payment of materials and equipment which can only be procured from the United States. ECA dollars approved for the Shell-Berre refinery total $250,000. Engineering costs will amount to $195,000 and $55,000 will be used to finance materials and equipment.

ECA approved the financing of the dollar cost of the first stage of the rehabilitation and modernization programs of the two refineries which consisted primarily in increasing the crude throughput capacities and in equipping the two plants with modern lube oil facilities. Both programs are now nearing completion.

In the case of the Donges refinery, procurement authorizations totaling $580,000 have now been issued, compared with the total of $750,000 approved for ECA financing.

ECA approved $1,890,000 for the financing of the dollar cost of the first stage of the Berre rehabilitation program against which $1,250,000 has been authorized to date. The estimated total cost in all currencies of the first stage of the construction program amounted to $9,400,000 in the case of the Donges refinery and to $31,600,000 in the case of the Shell-Berre refinery.

Aerial Survey Booklet

Abrams Aerial Survey Corp., Lansing, Mich., has published a 20-page brochure titled "Aerial Surveys and Maps from Photographs" which gives the ABC's of aerial photogrammetry. Copies are available on request.

Brazilian Company Increases Capital

The registered capital of the Refinaria E Exploracao De Petroleo Uniao is being raised from 60 to 300 million cruzeiros (U.S. $3,300,000 to U.S. $16,500,000) by the issue of 90,000 ordinary and 150,000 preferential shares. The latter do not carry the right to vote, but will have priority in the distribution of non-cumulative dividends to a minimum limit of ten percent. All shares are nominal and may only be taken up by native Brazilians. Brazilians married to foreigners under the regimen of "community of goods" may not subscribe.

In April last the company signed a contract with Hydrocarbon Research for the project and construction of a 20,000-barrel refinery at Capuava, in the municipality of Santo André 20 miles distant from the city of São Paulo. The plant is expected to begin operating early in 1953. Crude is to be pumped from Santos by the pipe line now under construction. The gasoline produced will be pumped into the tanks at Utinga, S. Paulo, and the fuel oil will be shipped in tank wagons.

The refinery will consist of a TCC cracking unit, provided with a flexible gas recovery plant, a catalytic polymerization unit and gasoline sweetening and blending plants. It is primarily projected to process 20,000 barrels per day of Oficina medium crude oil, but will not be limited to that type of crude. The intention is to use a severe cracking, so as to produce a maximum yield of gasoline together with some propane, butane, distillate fuel and No. 6 fuel-oil. With such cracking the estimated yields are:

Plant products	BPSD
Liquid propane	560
Excess butanes	1,005
Gasoline (Octane No. CFR-M clear 72.4)	13,830
Light distillate fuel oil	565
No. 6 fuel-oil	4,180

Professional Progress Award Winner

Chalmer Gatlin Kirkbride, vice president and director of Houdry Process Corp., has been chosen to receive the 1951 Professional Progress Award in chemical engineering, sponsored by Celanese Corp. The award, which carries with it a prize of $1,000, is administered by the American Institute of Chemical Engineers, and will be given at the organization's December meeting at Atlantic City.

Mr. Kirkbride has been with the Standard Oil Co. (Ind.), Pan American Refining Corp. and Magnolia Petroleum Co., and professor of chemical engineering at A. & M. College of Texas. He is the author of the book "Chemical Engineering Fundamentals," published in 1947, and of many technical papers.

Appoints South American Agent

Black, Sivalls & Bryson, Inc. has appointed Oil Field Sales & Service, C.A. of Anaco, Venezuela, to represent it in Venezuela, Colombia and Trinidad. Oil Field Sales & Service is headed by Allen Pike, president, and jointly owned by Paul Koester.

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New Gasket

Petroleum Mechanical Development Co. has announced the development of a new "Flex-Tip" ring joint gasket. The unit will be manufactured in all sizes used in well control for pressures of 2,000 psi and above. The design of the new ring embodies two independently acting seals. The first sealing mechanism is the standard API metal to metal seal. Two additional features are the resilient "Flex-Tip" and the inner and outer beads which offer substantial protection against mechanical damage to the smooth steel seating surfaces. The beads also protect the ring against corrosion, since the resilient material is little affected by oil, gas or commonly encountered chemicals.

"Fillerweld"

"Fillerweld," a new product designed to speed alloy-metal welding on applications where filler-metal must be added, has been announced by General Electric's welding department. Used with gas-shielded arc welders, Fillerweld allows the operator to control the continuous flow of filler-metal automatically by means of a finger switch mounted on the torch. The new welding attachment allows the operator to start or stop the flow of filler metal without breaking the arc.

New Drilling Mud Additive

Field research laboratories of Magnolia Petroleum Co., Dallas, have developed a leather fiber for mixing with drilling mud to seal off troublesome subsurface formations encountered while wells are being drilled. Leather floc is lighter and cheaper than other materials formerly used. When employed in drilling muds of a highly alkaline nature, the leather floc will be disposed of within 24 hours, according to the Magnolia experts, and will dispense with any need for filtering the mud after the sealing process is completed.

Refinery Waste Disposal

The second edition of Volume III, Chemical Wastes, of the API manual on Disposal of Refinery Wastes is off the press and available at $1.50 a copy through the American Petroleum Institute, 50 W. 50th Street, N. Y. 20. This new edition brings up to date all information the Committee on Disposal of Refinery Wastes has been able to collect on chemical wastes from refineries. The 40-page booklet contains five chapters which describe the properties and sources of chemical wastes in refineries, the effect of chemical wastes on surface waters, information on methods and devices for treatment and control of wastes and some recommended practices covering equipment and operation of disposal facilities. Extensive lists of references are included.

Induction Frequency Converters Bulletin

A new four-page bulletin, GEA-5637, on Tri-Clad induction frequency converters has been published by General Electric Co., Schenectady 5, N. Y. The booklet covers three-phase equipment in ratings from ¾ to 100 kw. It describes the fundamentals, operation, and construction features of the high-frequency power supply apparatus, and includes application information, modifications and limitations and complete tables of ratings and frame sizes.

To Supervise National Supply Move

F. E. Engel, office manager of The National Supply Co., will supervise all service functions in the company's new headquarters in Gateway Center, Pittsburgh. The assignment places Mr. Engel in charge of the integration in Gateway Center of Pittsburgh personnel and those persons who will be transferred to Pittsburgh from the company's general sales offices in Toledo, Ohio. The new headquarters is scheduled for occupancy on May 1, 1952.

New Crawler

The International TD-18A, a crawler tractor that is able to apply drawbar horsepower more effectively and economically, is described in a 24-page two color catalog recently issued by the International Harvester Export Co. This powerful diesel crawler has a six-speed transmission and a strengthened gear train that applies the engine's 107 horsepower to the tracks in a simple and direct line. Illustrated with action shots, specification charts and colored machine views, the booklet also includes information on matched allied equipment, such as pipebrooms, scrapers, dozers and winches. The catalog, E-79A, is available upon request from International Harvester Export Co., 180 North Michigan Ave. Chicago 1, U.S.A.

New Packaging Plant

Deep Rock Oil Corp. is building a new blending and packaging plant for motor oils and greases at its Cushing, Okla., refinery. The chemical plants division of Blaw-Knox Construction Co. has the contract for the refinery addition. It is expected that the new plant will be in operation late this year. Capacity of the new facility will be 6,000,000 gallons anually, which represents roughly one-third of the Cushing refinery's output of lubricating oils. The other two-thirds is sold in tank car lots to industrial users and compounders.

G.E. Promotes R. B. Reid

Ralston B. Reid of Schenectady, N. Y., has been appointed an assistant manager of the advertising and sales promotion department of General Electric Co.'s apparatus marketing division. He will coordinate activities of the department's five advertising sections. Mr. Reid has been manager of industrial advertising for the department since 1943 and has served General Electric in news, editorial and advertising capacities for the past 21 years.

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To Build Corpus Christi Refinery

Sunray Oil Corp. will build a new 25,000-barrel catalytic cracking refinery at Corpus Christi, Texas, to cost $10 million. The new refinery is to be constructed in conjunction with the company's present deep water crude oil terminal and tankage facilities at Corpus Christi. Sunray's coastal pipe line facilities will be capable of delivering 20,000 barrels daily into the refinery, and another 10,000 barrels is available from Sunray owned or controlled production which can be delivered into the refinery through facilities of other carriers.

Process units will consist of UOP fluid catalytic cracker, UOP hydrofluoric acid alkylation unit, UOP thermal cracker, gas concentration unit, UOP phosphoric acid polymerization unit and completed utilities, crude and vacuum unit, and Petreco desalters. The alkylation unit will produce about 1,600 barrels per day of aviation gasoline. Industrial detergents will be produced as a by-product of the gas recovery plant.

Sunray now operates three refineries at Sunray (Duncan) Okla., Allen, Okla., and Santa Maria, Calif. The company's total crude oil production in ten midcontinent states and California exceeds 75,000 barrels of crude oil daily, and with the new plant, its daily refining capacity at all plants will be approximately in balance with its crude production.

Mexican Production Rises

Mexico's daily production has reached 228,500 barrels—an increase of 3,500 barrels since September 1 when President Miguel Aleman made his annual State of the Nation address before the opening of Congress, it was announced in Mexico City by Senator Antonio Bermudez, Pemex director-general.

Senator Bermudez said Pemex will export 2,675,000 barrels of crude and refined products during October. He observed export figures vary from month to month because of fluctuations in available transport facilities.

Sulfur Plant In Slaughter Field

A 40-ton sulfur recovery unit will be constructed in the Slaughter gasoline plant of Stanolind Oil and Gas Co. near Sundown, Texas. Stanolind operates the plant for a group of eight owners including The Texas Co., Honolulu Oil Corp., Magnolia Petroleum Co., The Devonian Co., The Atlantic Refining Co., Saltmount Oil Co., and Mid-Continent Petroleum Corp. Fluor Corp., Ltd., of Los Angeles, Calif., will install the unit, which is expected to be in operation by March of 1952. The Slaughter plant can process 90 million cubic feet per day of casinghead gas. The sour gas contains up to 1½ percent of hydrogen sulfide and up to 7½ percent of carbon dioxide.

Gulf Promotion

Harry G. Taylor, Jr. has been appointed chief of the crude oil supply and disposition branch, Pittsburgh office of the production department, Gulf Oil Corp. Mr. Taylor joined Gulf in the Pittsburgh office of the purchasing department in March 1921, and was transferred to the production-pipeline department a year and a half later. During the last few years, he served as assistant to the chief of the crude oil supply and disposition branch of the department.

Open Texas Office

Chemical & Geological Laboratories, Casper, Wyoming, has opened a laboratory and office in Midland, Texas, to serve the Permian Basin with full diameter and routine core analysis. Manager of the Midland branch is Richard L. Brown, who is being transferred from Casper.

Appoints Assistant Treasurer

George R. Walker, Jr., has been appointed assistant treasurer of the International Petroleum Company, Ltd. Mr. Walker has been a senior foreign exchange analyst with the treasurer's department of Jersey Standard.

Atlantic Reorganizes Engineering

Reorganization of the engineering and construction department, with Lester M. Goldsmith heading it up as general manager, has been announced by the Atlantic Refining Co. Five major divisions were set up within the department, each headed by a manager or supervisor reporting to Mr. Goldsmith. The latter reports directly to executive vice president Henderson Supple, Jr.

The design division is managed by W. T. Dixon and consists of a design section and a drafting section.

The engineering research division, with E. H. Ten-Broeck as manager, is divided into three sections: mechanical, electrical and engineering methods and construction materials. The estimating, contracting and construction division, under the managership of C. E. Mullins, is composed of a construction section and an estimating and contracting section. The engineering services division, headed by H. F. Huf as manager and alternate to the general manager, is divided into three sections established on a geographical basis, each to serve all company activities in its respective area. These sections have been titled Marketing Territories, Point Breeze and Southwest. The office division, under the direction of H. E. Lippincott, assists in preparation of the departmental budget and maintains records to be used in connection with the planning and scheduling of work.

Resist LPgas Regulations in Mexico

Private bottled-gas firms in Mexico are in the middle of a fight against new safety regulations covering the handling of butane. The regulations were ordered by the Economy Ministry after several explosions, officially blamed on poor-quality tanks and mishandling, took a heavy toll in lives and property damage. A large part of Mexico City's 3,000,000 population, as well as many small and medium-sized factories, depends upon bottled gas for heating, cooking and fuel purposes.

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Southern Record

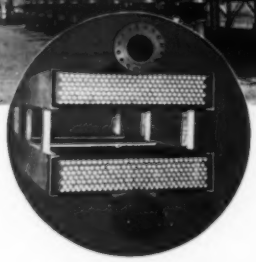
Southern Geophysical Co., Dallas, has published the first number of a new house magazine, "Southern Record," using a reproduction of a seismic record as its masthead. The Record will keep personnel in the widely scattered field groups acquainted with each other's activities.

Mataripe Refinery Output

During the first seven months of 1951 the Mataripe refinery in Bahia, Brazil, produced 156,914 barrels of gasoline, 11,609 barrels of kerosine, 32,163 barrels of diesel oil and 100,139 barrels of fuel oil. The plant's current capacity of 2,500 barrels daily is being doubled.

Fractionating Tray Bulletin

Koch Engineering Co., 321 West Douglas, Wichita, Kansas, has published a bulletin of the new "Benturi" type Kaskade fractionating tray. This bulletin gives information on the performance of trays in distillation, absorption and liquid-liquid extraction.



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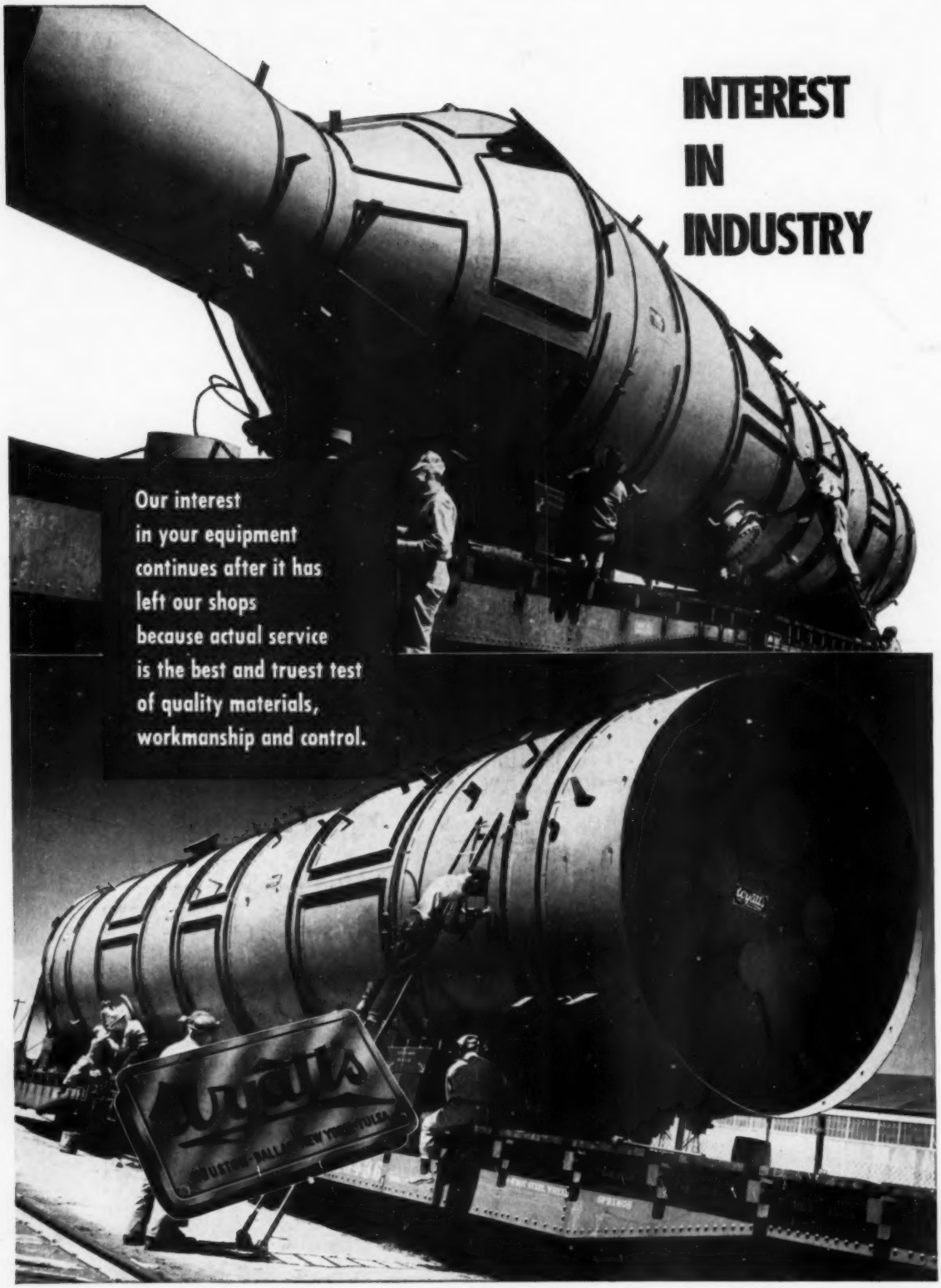
INTEREST
IN
INDUSTRY
Our interest
in your equipment
continues after it has
left our shops
because actual service
is the best and truest test
of quality materials,
workmanship and control.